THE ASTROPHYSICAL JOURNAL

AUTHOR INDEX

PARTS 1 & 2, VOLUMES 513 –515

1999 MARCH 1 TO APRIL 20

ACTON, L. W. A Stable Filament Cavity with a Hot Core. *H. S. Hudson, L. W. Acton, K. L. Harvey, & D. E. McKenzie.* 513, L83 (1999)

ADAMS, NIGEL G. New H and H_2 Reactions with Small Hydrocarbon Ions and Their Roles in Benzene Synthesis in Dense Interstellar Clouds. *Murray J. McEwan, Graham B. I. Scott, Nigel G. Adams, Lucia M. Babcock, R. Terzieva, & Eric Herbst.* 513, 287 (1999)

AI, GUOXIANG. See CHOU, DEAN-YI, et al. Acoustic Imaging in Helioseismology.

ALAM, JAN-E. Quark Nuggets as Baryonic Dark Matter. *Jan-e Alam, Sibaji Raha, & Bikash Sinha.* 513, 572 (1999)

ALLAMANDOLA, L. J. Direct Spectroscopic Evidence for Ionized Polycyclic Aromatic Hydrocarbons in the Interstellar Medium. *G. C. Sloan, T. L. Hayward, L. J. Allamandola, J. D. Bregman, B. DeVito, & D. M. Hudgins.* 513, L65 (1999)

The Spacing of the Interstellar 6.2 and 7.7 Micron Emission Features as an Indicator of Polycyclic Aromatic Hydrocarbon Size. *Douglas M. Hudgins & L. J. Allamandola.* 513, L69 (1999)

ALLER, HUGH D. See FALCKE, HEINO, et al. A Major Radio Outburst in III Zw 2 with an Extremely Inverted, Millimeter-peaked Spectrum.

ALLER, LAWRENCE H. Spectroscopic Observations of the Planetary Nebula NGC 6818. *Siek Hyung, Lawrence H. Aller, & Walter A. Feibelman.* 514, 878 (1999)

ALLER, MARGO F. See FALCKE, HEINO, et al. A Major Radio Outburst in III Zw 2 with an Extremely Inverted, Millimeter-peaked Spectrum.

ALVES, JOÃO. Correlation between Gas and Dust in Molecular Clouds. *João Alves, Charles J. Lada, & Elizabeth A. Lada.* 515, 265 (1999)

AMARI, T. Confined Disruption of a Three-dimensional Twisted Magnetic Flux Tube. *T. Amari & J. F. Luciani.* 515, L81 (1999)

AMATI, L. See PIRO, L., et al. The X-Ray Afterglow of the Gamma-Ray Burst of 1997 May 8: Spectral Variability and Possible Evidence of an Iron Line.

A Giant Outburst from SGR 1900+14 Observed with the *BeppoSAX* Gamma-Ray Burst Monitor. *M. Feroci, F. Frontera, E. Costa, L. Amati, M. Tavani, M. Rapisarda, & M. Orlandini.* 515, L9 (1999)

AMENDOLA, LUCA. The Scale of Homogeneity in the Las Campanas Redshift Survey. *Luca Amendola & Emilia Palladino.* 514, L1 (1999)

ANANTHARAMAIAH, K. R. G359.87+0.18, An FR II Radio Galaxy 15′ from Sagittarius A*: Implications for the Scattering Region in the Galactic Center. *T. Joseph W. Lazio, K. R. Anantharamaiah, W. M. Goss, Namir E. Kassim, & James M. Cordes.* 515, 196 (1999)

ANDRÉ, P. Discovery of an Extremely Young Accreting Protostar in Taurus. *P. André, F. Motte, & A. Bacmann.* 513, L57 (1999)

ANDREANI, P. The Enhancement and Decrement of the Sunyaev-Zeldovich Effect toward the *ROSAT* Cluster RX J0658−5557. *P. Andreani, H. Böhringer, G. Dall'Oglio, L. Martinis, P. Shaver, R. Lemke, L.-Å. Nyman, R. Booth, L. Pizzo, N. Whyborn, Y. Tanaka, & H. Liang.* 513, 23 (1999)

ANN, H. B. Smoothed Particle Hydrodynamic Simulations of Galactic Gaseous Disk with Bar: Distribution and Kinematic Structure of Molecular Clouds toward the Galactic Center. *C. W. Lee, H. M. Lee, H. B. Ann, & K. H. Kwon.* 513, 242 (1999)

ANTONELLI, L. A. See PIRO, L., et al. The X-Ray Afterglow of the Gamma-Ray Burst of 1997 May 8: Spectral Variability and Possible Evidence of an Iron Line.

ANTONUCCI, ROBERT. Ultraviolet Imaging Polarimetry of Narrow-Line Radio Galaxies. *Todd Hurt, Robert Antonucci, Ross Cohen, Anne Kinney, & Julian Krolik.* 514, 579 (1999)

APARICIO, ANTONIO. See GALLART, CARME, et al. *Hubble Space Telescope* Observations of the Local Group Dwarf Galaxy Leo I.

APARICIO, J. A. Experimental Stark Widths and Shifts of Several Ne I Spectral Lines. *J. A. del Val, J. A. Aparicio, & S. Mar.* 513, 535 (1999)

ARABADJIS, JOHN S. On the Extreme-Ultraviolet Emission from Galaxy Clusters. *John S. Arabadjis & Joel N. Bregman.* 514, 607 (1999)

ARRIBAS, S. The Starburst-AGN Connection in Active Galaxies: The Massive Nuclear Star-forming Disk in NGC 4303. *L. Colina & S. Arribas.* 514, 637 (1999)

ASCHWANDEN, MARKUS J. Three-dimensional Stereoscopic Analysis of Solar Active Region Loops. I. *SOHO*/EIT Observations at Temperatures of (1.0–1.5) $\times 10^6$ K. *Markus J. Aschwanden, Jeffrey S. Newmark, Jean-Pierre Delaboudinière, Werner M. Neupert, J. A. Klimchuk, G. Allen Gary, Fabrice Portier-Fozzani, & Arik Zucker.* 515, 842 (1999)

ASHMAN, KEITH M. The Globular Cluster System in the Inner Region of M87. *Arunav Kundu, Bradley C. Whitmore, William B. Sparks, F. Duccio Macchetto, Stephen E. Zepf, & Keith M. Ashman.* 513, 733 (1999)

ASPLUND, MARTIN. First Observations of an R Coronae Borealis Star with the Space Telescope Imaging Spectrograph: RY Sagittarii near Maximum Light. *Geoffrey C. Clayton, T. R. Ayres, Warrick A. Lawson, John S. Drilling, P. Woitke, & Martin Asplund.* 515, 351 (1999)

ATRIO-BARANDELA, F. Temperature Anisotropies and Distortions Induced by Hot Intracluster Gas on the Cosmic Microwave Background. *F. Atrio-Barandela & J. P. Mücket.* 515, 465 (1999)

AUDARD, MARC. Implications from Extreme-Ultraviolet Observations for Coronal Heating of Active Stars. *Marc Audard, Manuel Güdel, & Edward F. Guinan.* 513, L53 (1999)

AVERY, LORNE W. See WILSON, CHRISTINE D., et al. Submillimeter Continuum Emission in the ρ Ophiuchi Molecular Cloud: Filaments, Arcs, and an Unidentified Far-Infrared Object.

AWAKI, H. Broadband X-Ray Observations of the Narrow-Line X-Ray Galaxy NGC 5506. *T. Wang, T. Mihara, C. Otani, M. Matsuoka, & H. Awaki.* 515, 567 (1999)

AYRES, T. R. First Observations of an R Coronae Borealis Star with the Space Telescope Imaging Spectrograph: RY Sagittarii near Maximum Light. *Geoffrey C. Clayton, T. R. Ayres, Warrick A. Lawson, John S. Drilling, P. Woitke, & Martin Asplund.* 515, 351 (1999)

BABCOCK, LUCIA M. New H and H_2 Reactions with Small Hydrocarbon Ions and Their Roles in Benzene Synthesis in Dense Interstellar Clouds. *Murray J. McEwan, Graham B. I. Scott, Nigel G. Adams, Lucia M. Babcock, R. Terzieva, & Eric Herbst.* 513, 287 (1999)

BACMANN, A. Discovery of an Extremely Young Accreting Protostar in Taurus. *P. André, F. Motte, & A. Bacmann.* 513, L57 (1999)

BAILYN, CHARLES D. The Distribution of Collisionally Induced Blue Stragglers in the Color-Magnitude Diagram. *Alison Sills & Charles D. Bailyn.* 513, 428 (1999)

Hubble Space Telescope Observations of the Central-Cusp Globular Cluster NGC 6752: the Effect of Binary Stars on the Luminosity Function in the Core. *Eric P. Rubenstein & Charles D. Bailyn.* 513, L33 (1999)

BALAKRISHNAN, N. Quantum-mechanical Study of Ro-vibrational Transitions in H_2 Induced by He Atoms. *N. Balakrishnan, R. C. Forrey, & A. Dalgarno.* 514, 520 (1999)

BALL, LEWIS. Origin of the Transient, Unpulsed Radio Emission from the PSR B1259−63 Binary System. *Lewis Ball, Andrew Melatos, Simon Johnston, & Olaf Skjæraasen.* 514, L39 (1999)

BALLESTER, GILDA E. See PAHRE, MICHAEL A., et al. Detection of Surface Brightness Fluctuations in NGC 4373 Using the *Hubble Space Telescope*.

See KRIST, JOHN E., et al. *Hubble Space Telescope* WFPC2 Imaging of XZ Tauri: Time Evolution of a Herbig-Haro Bow Shock.

BALLESTEROS-PAREDES, JAVIER. Clouds as Turbulent Density Fluctuations: Implications for Pressure Confinement and Spectral Line Data Interpretation. *Javier Ballesteros-Paredes, Enrique Vázquez-Semadeni, & John Scalo.* 515, 286 (1999)

BAND, DAVID L. A Statistical Treatment of the Gamma-Ray Burst "No Host Galaxy" Problem. II. Energies of Standard Candle Bursts. *David L. Band, Dieter H. Hartmann, & Bradley E. Schaefer.* 514, 862 (1999)

BARGER, A. J. See FRAYER, D. T., et al. Molecular Gas in the $z = 2.565$ Submillimeter Galaxy SMM J14011+0252.

BARICHELLO, L. B. A Discrete-Ordinates Solution for a Polarization Model with Complete Frequency Redistribution. *L. B. Barichello & C. E. Siewert.* 513, 370 (1999)

BARING, MATTHEW G. Radio to Gamma-Ray Emission from Shell-Type Supernova Remnants: Predictions from Nonlinear Shock Acceleration Models. *Matthew G. Baring, Donald C. Ellison, Stephen P. Reynolds, Isabelle A. Grenier, & Philippe Goret.* 513, 311 (1999)

BARKANA, RENNAN. A Possible Gravitational Lens in the Hubble Deep Field South. *Rennan Barkana, Roger Blandford, & David W. Hogg.* 513, L91 (1999)

BARLOW, M. J. The SiC Problem: Astronomical and Meteoritic Evidence. *A. K. Speck, A. M. Hofmeister, & M. J. Barlow.* 513, L87 (1999)

Water Ice, Silicate, and Polycyclic Aromatic Hydrocarbon Emission Features in the *Infrared Space Observatory* Spectrum of the Carbon-rich Planetary Nebula CPD −56°8032. *Martin Cohen, M. J. Barlow, R. J. Sylvester, X.-W. Liu, P. Cox, T. Lim, B. Schmitt, & A. K. Speck.* 513, L135 (1999)

BARLOW, TOM A. Small-Scale Structure at High Redshift. I. Glimpses of the Interstellar Medium at Redshift ∼3.5. *Michael Rauch, Wallace L. W. Sargent, & Tom A. Barlow.* 515, 500 (1999)

BARSONY, MARY. L1448 IRS 2: A HIRES-identified Class 0 Protostar. *JoAnn O'Linger, Grace Wolf-Chase, Mary Barsony, & Derek Ward-Thompson.* 515, 696 (1999)

BARTH, AARON J. Polarized Broad Hα Emission from the LINER Nucleus of NGC 1052. *Aaron J. Barth, Alexei V. Filippenko, & Edward C. Moran.* 515, L61 (1999)

BAUER, JAMES M. The $z = 1.6748$ C I Absorber toward PKS 1756+237. *Katherine C. Roth & James M. Bauer.* 515, L57 (1999)

BAUM, S. The Radio-Optical Jet in NGC 3862 from Parsec to Subkiloparsec Scales. *L. Lara, L. Feretti, G. Giovannini, S. Baum, W. D. Cotton, C. P. O'Dea, & T. Venturi.* 513, 197 (1999)

BAUM, S. A. See SAVAGLIO, S., et al. The Lyα Forest of the Quasar in the Hubble Deep Field South.

BAZZANO, A. Bursts from GS 1826−238: A Clocked Thermonuclear Flashes Generator. *P. Ubertini, A. Bazzano, M. Cocchi, L. Natalucci, J. Heise, J. M. Muller, & J. J. M. in 't Zand.* 514, L27 (1999)

BEAUCHAMP, DOMINIQUE. The Stellar Populations of Spiral Disks. II. Measuring and Modeling the Radial Distribution of Absorption Spectral Indices. *Mercedes Mollá, Eduardo Hardy, & Dominique Beauchamp.* 513, 695 (1999)

BEAULIEU, SYLVIE F. A Survey of Planetary Nebulae in the Southern Galactic Bulge. *Sylvie F. Beaulieu, Michael A. Dopita, & Kenneth C. Freeman.* 515, 610 (1999)

BECKER, R. H. Discovery of a Radio-loud/Radio-quiet Binary Quasar. *M. S. Brotherton, Michael D. Gregg, R. H. Becker, S. A. Laurent-Muehleisen, R. L. White, & S. A. Stanford.* 514, L61 (1999)

BECKLIN, E. E. High Spatial Resolution Imaging of Arp 220 from 3 to 25 Microns. *B. T. Soifer, G. Neugebauer, K. Matthews, E. E. Becklin, M. Ressler, M. W. Werner, A. J. Weinberger, & E. Egami.* 513, 207 (1999)

See SCHNEIDER, GLENN, et al. NICMOS Imaging of the HR 4796A Circumstellar Disk.

BEERS, TIMOTHY C. The Earliest Phases of Galaxy Evolution. *Cristina Chiappini, Francesca Matteucci, Timothy C. Beers, & Ken'ichi Nomoto.* 515, 226 (1999)

BEGELMAN, MITCHELL C. X-Ray Iron Line Reverberation from Black Hole Accretion Disks. *Chistopher S. Reynolds, Andrew J. Young, Mitchell C. Begelman, & Andrew C. Fabian.* 514, 164 (1999)

Rossi X-Ray Timing Explorer Observation of Cygnus X-1. III. Implications for Compton Corona and Advection-dominated Accretion Flow Models. *Michael A. Nowak, Jörn Wilms, Brian A. Vaughan, James B. Dove, & Mitchell C. Begelman.* 515, 726 (1999)

BEKKI, KENJI. Stellar Populations in Gas-rich Galaxy Mergers. II. Feedback Effects of Type Ia and Type II Supernovae. *Kenji Bekki & Yasuhiro Shioya.* 513, 108 (1999)

BENEDICT, G. F. *Hubble Space Telescope* Fine Guidance Sensor Astrometric Parallaxes for Three Dwarf Novae: SS Aurigae, SS Cygni, and U Geminorum. *Thomas E. Harrison, Bernard J. McNamara, Paula Szkody, Barbara E. McArthur, G. F. Benedict, Arnold R. Klemola, & Ronald L. Gilliland.* 515, L93 (1999)

BENITEZ, NARCISO. Detection of Evolved High-Redshift Galaxies in Deep NICMOS/VLT Images. *Narciso Benitez, Tom Broadhurst, Rychard Bouwens, Joseph Silk, & Piero Rosati.* 515, L65 (1999)

BENJAMIN, ROBERT A. Improving Predictions for Helium Emission Lines. *Robert A. Benjamin, Evan D. Skillman, & Derck P. Smits.* 514, 307 (1999)

BENOIST, C. Biasing and High-Order Statistics from the Southern-Sky Redshift Survey. *C. Benoist, A. Cappi, L. N. da Costa, S. Maurogordato, F. R. Bouchet, & R. Schaeffer.* 514, 563 (1999)

BERGER, J. P. Sub–Astronomical Unit Structure of the Near-Infrared Emission from AB Aurigae. *R. Millan-Gabet, F. P. Schloerb, W. A. Traub, F. Malbet, J. P. Berger, & J. D. Bregman.* 513, L131 (1999)

BERNSTEIN, M. P. The Interstellar 4.62 Micron Band. *Y. J. Pendleton, A. G. G. M. Tielens, A. T. Tokunaga, & M. P. Bernstein.* 513, 294 (1999)

BERTELLI, GIANPAOLO. See GALLART, CARME, et al. *Hubble Space Telescope* Observations of the Local Group Dwarf Galaxy Leo I.

BERTOLA, FRANCESCO. Objects in NGC 205 Resolved into Stellar Associations by *Hubble Space Telescope* Ultraviolet Imaging. *Michele Cappellari, Francesco Bertola, David Burstein, Lucio M. Buson, Laura Greggio, & Alvio Renzini.* 515, L17 (1999)

BERTRAM, R. The R Aquarii Jet in Hindsight. *J. M. Hollis, R. Bertram, R. M. Wagner, & C. O. Lampland.* 514, 895 (1999)

BÉZARD, B. Detection of the Methyl Radical on Neptune. *B. Bézard, P. N. Romani, H. Feuchtgruber, & T. Encrenaz.* 515, 868 (1999)

BHAT, N. D. RAMESH. Long-Term Scintillation Studies of Pulsars. II. Refractive Effects and the Spectrum of Plasma Density Fluctuations. *N. D. Ramesh Bhat, Yashwant Gupta, & A. Pramesh Rao.* 514, 249 (1999)

Long-Term Scintillation Studies of Pulsars. III. Testing Theoretical Models of Refractive Scintillation. *N. D. Ramesh Bhat, A. Pramesh Rao, & Yashwant Gupta.* 514, 272 (1999)

BILDSTEN, LARS. The Thermal X-Ray Spectra of Centaurus X-4, Aquila X-1, and 4U 1608−522 in Quiescence. *Robert E. Rutledge, Lars Bildsten, Edward F. Brown, George G. Pavlov, & Vyatcheslav E. Zavlin.* 514, 945 (1999)

BISNOVATYI-KOGAN, G. S. Magnetic Propeller Outflows. *R. V. E. Lovelace, M. M. Romanova, & G. S. Bisnovatyi-Kogan.* 514, 368 (1999)

BJORKMAN, J. E. Theoretical Modeling of *ISO* Results on Planetary Nebula NGC 7027. *Min Yan, S. R. Federman, A. Dalgarno, & J. E. Bjorkman.* 515, 640 (1999)

BLACKMAN, ERIC G. Nonlinear α-Effect in Dynamo Theory. *George B. Field, Eric G. Blackman, & Hongsong Chou.* 513, 638 (1999)

BLAIN, A. W. See FRAYER, D. T., et al. Molecular Gas in the $z = 2.565$ Submillimeter Galaxy SMM J14011+0252.

BLAIR, WILLIAM P. The Far-Ultraviolet Spectrum and Short-Timescale Variability of AM Herculis from Observations with the Hopkins Ultraviolet Telescope. *Bradford W. Greeley, William P. Blair, Knox S. Long, & John C. Raymond.* 513, 491 (1999)

BLAKE, GEOFFREY A. Envelope Structure of Deeply Embedded Young Stellar Objects in the Serpens Molecular Cloud. *Michiel R. Hogerheijde, Ewine F. van Dishoeck, Jante M. Salverda, & Geoffrey A. Blake.* 513, 350 (1999)

BLAKESLEE, JOHN P. A Lensed Arc in the Low-Redshift Cluster Abell 2124. *John P. Blakeslee & Mark R. Metzger.* 513, 592 (1999)

BLANDFORD, ROGER. A Possible Gravitational Lens in the Hubble Deep Field South. *Rennan Barkana, Roger Blandford, & David W. Hogg.* 513, L91 (1999)

BLASI, PASQUALE. Cosmological Magnetic Field Limits in an Inhomogeneous Universe. *Pasquale Blasi, Scott Burles, & Angela V. Olinto.* 514, L79 (1999)

BLITZ, LEO. High-Velocity Clouds: Building Blocks of the Local Group. *Leo Blitz, David N. Spergel, Peter J. Teuben, Dap Hartmann, & W. Butler Burton.* 514, 818 (1999)

BODEN, A. F. The Visual Orbit of ι Pegasi. *A. F. Boden, C. D. Koresko, G. T. van Belle, M. M. Colavita, P. J. Dumont, J. Gubler, S. R. Kulkarni, B. F. Lane, D. Mobley, M. Shao, J. K. Wallace, (The PTI Collaboration), & G. W. Henry.* 515, 356 (1999)

BÖHRINGER, H. See ANDREANI, P., et al. The Enhancement and Decrement of the Sunyaev-Zeldovich Effect toward the *ROSAT* Cluster RX J0658−5557.

See DE GRANDI, S., et al. The X-Ray Luminosity Function of Bright Galaxy Clusters in the Local Universe.

See DE GRANDI, S., et al. A Flux-limited Sample of Bright Clusters of Galaxies from the Southern Part of the *ROSAT* All-Sky Survey: The Catalog and log *N*–log*S*.

BOER, M. No Evidence for Gamma-Ray Burst/Abell Cluster or Gamma-Ray Burst/Radio-quiet Quasar Correlations. *K. Hurley, D. H. Hartman, C. Kouveliotou, R. M. Kippen, J. Laros, T. Cline, & M. Boer.* 515, 497 (1999)

BÖTTCHER, MARKUS. Fireball Loading and the Blast-Wave Model of Gamma-Ray Bursts. *Charles D. Dermer, James Chiang, & Markus Böttcher.* 513, 656 (1999)

The Synchrotron Peak Shift during High-Energy Flares of Blazars. *Markus Böttcher.* 515, L21 (1999)

The External Shock Model of Gamma-Ray Bursts: Three Predictions and a Paradox Resolved. *Charles D. Dermer, Markus Böttcher, & James Chiang.* 515, L49 (1999)

BOLATTO, ALBERTO D. A Semianalytical Model for the Observational Properties of the Dominant Carbon Species at Different Metallicities. *Alberto D. Bolatto, James M. Jackson, & James G. Ingalls.* 513, 275 (1999)

BOND, J. RICHARD. The Canada-UK Deep Submillimeter Survey: First Submillimeter Images, the Source Counts, and Resolution of the Background. *Stephen Eales, Simon Lilly, Walter Gear, Loretta Dunne, J. Richard Bond, Francois Hammer, Olivier Le Fèvre, & David Crampton.* 515, 518 (1999)

BONET, J. A. Time Series of Solar Granulation Images. II. Evolution of Individual Granules. *J. Hirzberger, J. A. Bonet, M. Vázquez, & A. Hanslmeier.* 515, 441 (1999)

BOOTH, R. See ANDREANI, P., et al. The Enhancement and Decrement of the Sunyaev-Zeldovich Effect toward the *ROSAT* Cluster RX J0658−5557.

BOUCHET, F. R. Biasing and High-Order Statistics from the Southern-Sky Redshift Survey. *C. Benoist, A. Cappi, L. N. da Costa, S. Maurogordato, F. R. Bouchet, & R. Schaeffer.* 514, 563 (1999)

BOUGHN, STEPHEN P. On Radio and X-Ray Emission Mechanisms in Nearby, X-Ray–bright Galactic Nuclei. *Insu Yi & Stephen P. Boughn.* 515, 576 (1999)

BOUWENS, RYCHARD. Detection of Evolved High-Redshift Galaxies in Deep NICMOS/VLT Images. *Narciso Benitez, Tom Broadhurst, Rychard Bouwens, Joseph Silk, & Piero Rosati.* 515, L65 (1999)

BOWEN, DAVID V. On the Origin of Damped Lyα Systems: A Case for Low Surface Brightness Galaxies? *Raul Jimenez, David V. Bowen, & Francesca Matteucci.* 514, L83 (1999)

BOWER, GEOFFREY C. See FALCKE, HEINO, et al. A Major Radio Outburst in III Zw 2 with an Extremely Inverted, Millimeter-peaked Spectrum.

BRAGE, TOMAS. Theoretical Oscillator Strengths and Hyperfine Structure in Hg II. *Tomas Brage, Charles Proffitt, & David S. Leckrone.* 513, 524 (1999)

BRAND, P. W. J. L. High-Resolution Infrared Spectroscopy and Nuclear Clusters in the Starburst Galaxy NGC 1614. *P. J. Puxley & P. W. J. L. Brand.* 514, 675 (1999)

BRANDENBURG, A. A Supernova-regulated Interstellar Medium: Simulations of the Turbulent Multiphase Medium. *M. J. Korpi, A. Brandenburg, A. Shukurov, I. Tuominen, & Å Nordlund.* 514, L99 (1999)

BRAUN, D. C. Helioseismic Images of an Active Region Complex. *D. C. Braun & C. Lindsey.* 513, L79 (1999)

Seismic Images of a Solar Flare. *A.-C. Donea, D. C. Braun, & C. Lindsey.* 513, L143 (1999)

BREGMAN, J. D. Direct Spectroscopic Evidence for Ionized Polycyclic Aromatic Hydrocarbons in the Interstellar Medium. *G. C. Sloan, T. L. Hayward, L. J. Allamandola, J. D. Bregman, B. DeVito, & D. M. Hudgins.* 513, L65 (1999)

Sub–Astronomical Unit Structure of the Near-Infrared Emission from AB Aurigae. *R. Millan-Gabet, F. P. Schloerb, W. A. Traub, F. Malbet, J. P. Berger, & J. D. Bregman.* 513, L131 (1999)

BREGMAN, JOEL N. On the Extreme-Ultraviolet Emission from Galaxy Clusters. *John S. Arabadjis & Joel N. Bregman.* 514, 607 (1999)

BRESOLIN, FABIO. See KELSON, DANIEL D., et al. The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XIX. The Discovery of Cepheids in and a New Distance to NGC 3198.

See SILBERMANN, N. A., et al. The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XIV. The Cepheids in NGC 1365.

BRIGHENTI, FABRIZIO. A Comparison of Metal Enrichment Histories in Rich Clusters and Individual Luminous Elliptical Galaxies. *Fabrizio Brighenti & William G. Mathews.* 515, 542 (1999)

BROADHURST, T. The Redshift of the Gravitationally Lensed Radio Source PKS 1830−211. *C. Lidman, F. Courbin, G. Meylan, T. Broadhurst, B. Frye, & W. J. W. Welch.* 514, L57 (1999)

BROADHURST, TOM. Detection of Evolved High-Redshift Galaxies in Deep NICMOS/VLT Images. *Narciso Benitez, Tom Broadhurst, Rychard Bouwens, Joseph Silk, & Piero Rosati.* 515, L65 (1999)

BROGAN, C. L. Detection of Magnetic Fields toward M17 through the H I Zeeman Effect. *C. L. Brogan, T. H. Troland, D. A. Roberts, & R. M. Crutcher.* 515, 304 (1999)

BROSIUS, JEFFREY W. Using Temporal Variations of the Nonthermal Redshifted Lyalpha Emission to Deduce Properties of Proton Beams Injected into a Stellar Atmosphere. *Jeffrey W. Brosius & Bruce E. Woodgate.* 514, 430 (1999)

BROTHERTON, M. S. Discovery of a Radio-loud/Radio-quiet Binary Quasar. *M. S. Brotherton, Michael D. Gregg, R. H. Becker, S. A. Laurent-Muehleisen, R. L. White, & S. A. Stanford.* 514, L61 (1999)

The PG X-Ray QSO Sample: Links between the Ultraviolet–X-Ray Continuum and Emission Lines. *Beverley J. Wills, A. Laor, M. S. Brotherton, D. Wills, B. J. Wilkes, G. J. Ferland, & Zhaohui Shang.* 515, L53 (1999)

BROWN, ALEXANDER. *Extreme Ultraviolet Explorer* Photometry of RS Canum Venaticorum Systems: Four Flaring Megaseconds. *Rachel A. Osten & Alexander Brown.* 515, 746 (1999)

BROWN, EDWARD F. The Thermal X-Ray Spectra of Centaurus X-4, Aquila X-1, and 4U 1608−522 in Quiescence. *Robert E. Rutledge, Lars Bildsten, Edward F. Brown, George G. Pavlov, & Vyatcheslav E. Zavlin.* 514, 945 (1999)

BROWN, T. M. See SAVAGLIO, S., et al. The Lyα Forest of the Quasar in the Hubble Deep Field South.

BRYDEN, G. Tidally Induced Gap Formation in Protostellar Disks: Gap Clearing and Suppression of Protoplanetary Growth. *G. Bryden, Xingming Chen, D. N. C. Lin, Richard P. Nelson, & John C. B. Papaloizou.* 514, 344 (1999)

BUCHALTER, ARI. Weakly Nonlinear Clustering for Arbitrary Expansion Histories. *Marc Kamionkowski & Ari Buchalter.* 514, 7 (1999)

BUCHERT, THOMAS. A Global Descriptor of Spatial Pattern Interaction in the Galaxy Distribution. *Martin Kerscher, María Jesús Pons-Bordería, Jens Schmalzing, Roberto Trasarti-Battistoni, Thomas Buchert, Vicent J. Martínez, & Riccardo Valdarnini.* 513, 543 (1999)

BURLES, SCOTT. Cosmological Magnetic Field Limits in an Inhomogeneous Universe. *Pasquale Blasi, Scott Burles, & Angela V. Olinto.* 514, L79 (1999)

BURROWS, CHRISTOPHER J. See PAHRE, MICHAEL A., et al. Detection of Surface Brightness Fluctuations in NGC 4373 Using the *Hubble Space Telescope*.

See KRIST, JOHN E., et al. *Hubble Space Telescope* WFPC2 Imaging of XZ Tauri: Time Evolution of a Herbig-Haro Bow Shock.

BURSTEIN, DAVID. Objects in NGC 205 Resolved into Stellar Associations by *Hubble Space Telescope* Ultraviolet Imaging. *Michele Cappellari, Francesco Bertola, David Burstein, Lucio M. Buson, Laura Greggio, & Alvio Renzini.* 515, L17 (1999)

BURTON, W. BUTLER. High-Velocity Clouds: Building Blocks of the Local Group. *Leo Blitz, David N. Spergel, Peter J. Teuben, Dap Hartmann, & W. Butler Burton.* 514, 818 (1999)

BUSON, LUCIO M. Objects in NGC 205 Resolved into Stellar Associations by *Hubble Space Telescope* Ultraviolet Imaging. *Michele Cappellari, Francesco Bertola, David Burstein, Lucio M. Buson, Laura Greggio, & Alvio Renzini.* 515, L17 (1999)

BUXTON, M. See HJELLMING, R. M., et al. Radio and X-Ray Observations of the 1998 Outburst of the Recurrent X-Ray Transient 4U 1630−47.

CACCIANIGA, ALESSANDRO. The REX Survey: A Search for Radio-emitting X-Ray Sources. *Alessandro Caccianiga, Tommaso Maccacaro, Anna Wolter, Roberto Della Ceca, & Isabella M. Gioia.* 513, 51 (1999)

CADAVID, A. C. Characteristic Scales of Photospheric Flows and Their Magnetic and Temperature Markers. *J. K. Lawrence, A. C. Cadavid, & A. A. Ruzmaikin.* 513, 506 (1999)

CAMPUSANO, LUIS E. A New Assessment of the Completeness of Quasar Surveys: Implications for the Luminosity Function. *Matthew J. Graham, Roger G. Clowes, & Luis E. Campusano.* 513, 69 (1999)

CANTÓ, JORGE. Disk and Outflow in Cepheus A–HW2: Interferometric SiO and HCO^+ Observations. *José F. Gómez, Anneila I. Sargent, José M. Torrelles, Paul T. P. Ho, Luis F. Rodríguez, Jorge Cantó, & Guido Garay.* 514, 287 (1999)

CAPPELLARI, MICHELE. Objects in NGC 205 Resolved into Stellar Associations by *Hubble Space Telescope* Ultraviolet Imaging. *Michele Cappellari, Francesco Bertola, David Burstein, Lucio M. Buson, Laura Greggio, & Alvio Renzini.* 515, L17 (1999)

CAPPI, A. Biasing and High-Order Statistics from the Southern-Sky Redshift Survey. *C. Benoist, A. Cappi, L. N. da Costa, S. Maurogordato, F. R. Bouchet, & R. Schaeffer.* 514, 563 (1999)

CARIGI, L. Dark Matter and the Chemical Evolution of Irregular Galaxies. *L. Carigi, P. Colín, & M. Peimbert.* 514, 787 (1999)

CARILLI, C. L. The Radio-to-Submillimeter Spectral Index as a Redshift Indicator. *C. L. Carilli & Min Su Yun.* 513, L13 (1999)

CARLSTROM, JOHN E. Interferometric Observation of Cosmic Microwave Background Anisotropies. *Martin White, John E. Carlstrom, Mark Dragovan, & William L. Holzapfel.* 514, 12 (1999)

CAROLLO, C. M. See SAVAGLIO, S., et al. The Lyα Forest of the Quasar in the Hubble Deep Field South.

CAROLLO, C. MARCELLA. Large Stellar Disks in Small Elliptical Galaxies. *Hans-Walter Rix, C. Marcella Carollo, & Ken Freeman.* 513, L25 (1999)

CASERTANO, STEFANO. See PAHRE, MICHAEL A., et al. Detection of Surface Brightness Fluctuations in NGC 4373 Using the *Hubble Space Telescope*.

CATELAN, PAOLO. How Dark Matter Halos Cluster in Lagrangian Space. *Cristiano Porciani, Paolo Catelan, & Cedric Lacey.* 513, L99 (1999)

CATTANEO, FAUSTO. On the Origin of Magnetic Fields in the Quiet Photosphere. *Fausto Cattaneo.* 515, L39 (1999)

CEN, RENYUE. Where Are the Baryons? *Renyue Cen & Jeremiah P. Ostriker.* 514, 1 (1999)

CESARONI, RICCARDO. Ammonia Absorption toward the Ultracompact H II Regions G45.12+0.13 and G45.47+0.05. *Peter Hofner, Sarah Peterson, & Riccardo Cesaroni.* 514, 899 (1999)

CHA, ALEXANDRA N. The Distance to the Vela Supernova Remnant. *Alexandra N. Cha, Kenneth R. Sembach, & Anthony C. Danks.* 515, L25 (1999)

CHABRIER, G. Is Galactic Dark Matter White? *G. Chabrier.* 513, L103 (1999)

CHADWICK, P. M. Very High Energy Gamma Rays from PKS 2155−304. *P. M. Chadwick, K. Lyons, T. J. L. McComb, K. J. Orford, J. L. Osborne, S. M. Rayner, S. E. Shaw, K. E. Turver, & G. J. Wieczorek.* 513, 161 (1999)

CHAE, JONGCHUL. Extreme-Ultraviolet Jets and Hα Surges in Solar Microflares. *Jongchul Chae, Jiong Qiu, Haimin Wang, & Philip R. Goode.* 513, L75 (1999)

CHAE, KYU-HYUN. *Hubble Space Telescope* Observations of the Gravitationally Lensed Cloverleaf Broad Absorption Line QSO H1413+1143: Modeling the Lens. *Kyu-Hyun Chae & David A. Turnshek.* 514, 587 (1999)

CHALLINOR, ANTHONY. Cosmic Microwave Background Anisotropies in the Cold Dark Matter Model: A Covariant and Gauge-invariant Approach. *Anthony Challinor & Anthony Lasenby.* 513, 1 (1999)

CHANG, HSIANG-KUANG. See CHOU, DEAN-YI, et al. Acoustic Imaging in Helioseismology.

CHARRO, E. Analysis of the Triplet Transitions from the $3d^2$ Configuration in Fe VII. *E. Charro & I. Martín.* 513, 997 (1999)

CHECHETKIN, V. M. Hydrodynamic Simulations of Counterrotating Accretion Disks. *O. A. Kuznetsov, R. V. E. Lovelace, M. M. Romanova, & V. M. Chechetkin.* 514, 691 (1999)

CHEN, HUEI-RU. See CHOU, DEAN-YI, et al. Acoustic Imaging in Helioseismology.

CHEN, L. X-Ray Shots of Cygnus X-1. *Y. X. Feng, T. P. Li, & L. Chen.* 514, 373 (1999)

CHEN, P. F. Simulation of Magnetic Reconnection with Heat Conduction. *P. F. Chen, C. Fang, Y. H. Tang, & M. D. Ding.* 513, 516 (1999)

CHEN, W. Laboratory Detection of the Ring-Chain Carbenes HC_4N and HC_6N. *M. C. McCarthy, J.-U. Grabow, M. J. Travers, W. Chen, C. A. Gottlieb, & P. Thaddeus.* 513, 305 (1999)

CHEN, WAN. The Progenitor of the New COMPTEL/*ROSAT* Supernova Remnant in Vela. *Wan Chen & Neil Gehrels.* 514, L103 (1999)

CHEN, XINGMING. Tidally Induced Gap Formation in Protostellar Disks: Gap Clearing and Suppression of Protoplanetary Growth. *G. Bryden, Xingming Chen, D. N. C. Lin, Richard P. Nelson, & John C. B. Papaloizou.* 514, 344 (1999)

CHEN, YI-LIANG. See CHOU, DEAN-YI, et al. Acoustic Imaging in Helioseismology.

CHENG, K. S. Multicomponent X-Ray Emissions from Regions near or on the Pulsar Surface. *K. S. Cheng & L. Zhang.* 515, 337 (1999)

CHENG, YU-CHUNG N. Gravitational Lensing and Dark Structures. *Yu-Chung N. Cheng & Lawrence M. Krauss.* 514, 25 (1999)

CHIANG, JAMES. Fireball Loading and the Blast-Wave Model of Gamma-Ray Bursts. *Charles D. Dermer, James Chiang, & Markus Böttcher.* 513, 656 (1999)

Time-integrated Gamma-Ray Burst Synchrotron Spectra from Blast-Wave/Cloud Interactions. *James Chiang.* 514, 856 (1999)

The External Shock Model of Gamma-Ray Bursts: Three Predictions and a Paradox Resolved. *Charles D. Dermer, Markus Böttcher, & James Chiang.* 515, L49 (1999)

CHIAPPINI, CRISTINA. The Earliest Phases of Galaxy Evolution. *Cristina Chiappini, Francesca Matteucci, Timothy C. Beers, & Ken'ichi Nomoto.* 515, 226 (1999)

CHINCARINI, G. See DE GRANDI, S., et al. The X-Ray Luminosity Function of Bright Galaxy Clusters in the Local Universe.

See DE GRANDI, S., et al. A Flux-limited Sample of Bright Clusters of Galaxies from the Southern Part of the *ROSAT* All-Sky Survey: The Catalog and log N–log$S$.

CHIOSI, CESARE. See GALLART, CARME, et al. *Hubble Space Telescope* Observations of the Local Group Dwarf Galaxy Leo I.

CHOU, DEAN-YI. Acoustic Imaging in Helioseismology. *Dean-Yi Chou, Hsiang-Kuang Chang, Ming-Tsung Sun, Barry LaBonte, Huei-Ru Chen, Sheng-Jen Yeh, Heng-Tai Tang, Wei-Cheng Shiu, Yi-Liang Chen, Antonio Jimenez, Maria Cristina Rabello-Soares, Guoxiang Ai, Gwo-Ping Wang, Philip Goode, William Marquette, Shuhrat Ehgamberdiev, & Shukur Khalikov.* 514, 979 (1999)

CHOU, HONGSONG. Nonlinear α-Effect in Dynamo Theory. *George B. Field, Eric G. Blackman, & Hongsong Chou.* 513, 638 (1999)

CHOU, WENCHIEN. Dynamics of Plasma Close to the Horizon of a Schwarzschild Black Hole. *Wenchien Chou & Toshiki Tajima.* 513, 401 (1999)

CHU, M.-C. The Quadrupole Oscillations of Strange Quark Stars. *C. W. Yip, M.-C. Chu, & P. T. Leung.* 513, 849 (1999)

CHU, YOU-HUA. Supernova Remnants in the Magellanic Clouds. II. Supernova Remnant Breakouts from N11L and N86. *Rosa Murphy Williams, You-Hua Chu, John R. Dickel, R. Chris Smith, Douglas K. Milne, & P. Frank Winkler.* 514, 798 (1999)

CHURAZOV, E. A Hot Spot in Coma. *R. Hank Donnelly, M. Markevitch, W. Forman, C. Jones, E. Churazov, & M. Gilfanov.* 513, 690 (1999)

CHURCHWELL, E. A High-Resolution VLA and Optical Study of NGC 604. *E. Churchwell & W. M. Goss.* 514, 188 (1999)

CIARDULLO, ROBIN. Chemical Abundances of Planetary Nebulae in the Bulge and Disk of M31. *George H. Jacoby & Robin Ciardullo.* 515, 169 (1999)

The Circumstellar Extinction of Planetary Nebulae. *Robin Ciardullo & George H. Jacoby.* 515, 191 (1999)

CLARKE, JOHN T. See PAHRE, MICHAEL A., et al. Detection of Surface Brightness Fluctuations in NGC 4373 Using the *Hubble Space Telescope*.

See KRIST, JOHN E., et al. *Hubble Space Telescope* WFPC2 Imaging of XZ Tauri: Time Evolution of a Herbig-Haro Bow Shock.

CLAYTON, GEOFFREY C. A Reanalysis of the Ultraviolet Extinction from Interstellar Dust in the Large Magellanic Cloud. *K. A. Misselt, Geoffrey C. Clayton, & Karl D. Gordon.* 515, 128 (1999)

First Observations of an R Coronae Borealis Star with the Space Telescope Imaging Spectrograph: RY Sagittarii near Maximum Light. *Geoffrey C. Clayton, T. R. Ayres, Warrick A. Lawson, John S. Drilling, P. Woitke, & Martin Asplund.* 515, 351 (1999)

CLEMENT, CHRISTINE M. The Mode Change of the RR Lyrae Variable V79 in M3. *Christine M. Clement & Vitaly P. Goranskij.* 513, 767 (1999)

The RR Lyrae Period-Amplitude Relation as a Clue to the Origin of the Oosterhoff Dichotomy. *Christine M. Clement & Ian Shelton.* 515, L85 (1999)

CLINE, T. No Evidence for Gamma-Ray Burst/Abell Cluster or Gamma-Ray Burst/Radio-quiet Quasar Correlations. *K. Hurley, D. H. Hartman, C. Kouveliotou, R. M. Kippen, J. Laros, T. Cline, & M. Boer.* 515, 497 (1999)

CLOWES, ROGER G. A New Assessment of the Completeness of Quasar Surveys: Implications for the Luminosity Function. *Matthew J. Graham, Roger G. Clowes, & Luis E. Campusano.* 513, 69 (1999)

COCCHI, M. Bursts from GS 1826−238: A Clocked Thermonuclear Flashes Generator. *P. Ubertini, A. Bazzano, M. Cocchi, L. Natalucci, J. Heise, J. M. Muller, & J. J. M. in 't Zand.* 514, L27 (1999)

COHEN, MARTIN. Water Ice, Silicate, and Polycyclic Aromatic Hydrocarbon Emission Features in the *Infrared Space Observatory* Spectrum of the Carbon-rich Planetary Nebula CPD −56°8032. *Martin Cohen, M. J.*

Barlow, R. J. Sylvester, X.-W. Liu, P. Cox, T. Lim, B. Schmitt, & A. K. Speck. 513, L135 (1999)

COHEN, ROSS. Ultraviolet Imaging Polarimetry of Narrow-Line Radio Galaxies. *Todd Hurt, Robert Antonucci, Ross Cohen, Anne Kinney, & Julian Krolik.* 514, 579 (1999)

COIL, ALISON L. Infalling Gas toward the Galactic Center. *Alison L. Coil & Paul T. P. Ho.* 513, 752 (1999)

COLÍN, P. Dark Matter and the Chemical Evolution of Irregular Galaxies. *L. Carigi, P. Colín, & M. Peimbert.* 514, 787 (1999)

COLAVITA, M. M. See BODEN, A. F., et al. The Visual Orbit of ι Pegasi.

COLGATE, S. A. Rossby Wave Instability of Keplerian Accretion Disks. *R. V. E. Lovelace, H. Li, S. A. Colgate, & A. F. Nelson.* 513, 805 (1999)

COLINA, L. The Starburst-AGN Connection in Active Galaxies: The Massive Nuclear Star-forming Disk in NGC 4303. *L. Colina & S. Arribas.* 514, 637 (1999)

COLLINS, C. See DE GRANDI, S., et al. The X-Ray Luminosity Function of Bright Galaxy Clusters in the Local Universe.

See DE GRANDI, S., et al. A Flux-limited Sample of Bright Clusters of Galaxies from the Southern Part of the *ROSAT* All-Sky Survey: The Catalog and log *N*–log*S*.

CONTRERAS, M. E. VLA Observations of the Interacting-Wind Binary System WR 147. *M. E. Contreras & L. F. Rodríguez.* 515, 762 (1999)

COORAY, ASANTHA R. Gravitational Lensing as a Probe of Quintessence. *Asantha R. Cooray & Dragan Huterer.* 513, L95 (1999)

CORDES, JAMES M. G359.87+0.18, An FR II Radio Galaxy 15′ from Sagittarius A*: Implications for the Scattering Region in the Galactic Center. *T. Joseph W. Lazio, K. R. Anantharamaiah, W. M. Goss, Namir E. Kassim, & James M. Cordes.* 515, 196 (1999)

CORNWELL, T. J. CTD 93 and the Nature of Gigahertz-peaked Spectrum Radio Sources. *David B. Shaffer, K. I. Kellermann, & T. J. Cornwell.* 515, 558 (1999)

COSTA, E. See PIRO, L., et al. The X-Ray Afterglow of the Gamma-Ray Burst of 1997 May 8: Spectral Variability and Possible Evidence of an Iron Line.

A Giant Outburst from SGR 1900+14 Observed with the *BeppoSAX* Gamma-Ray Burst Monitor. *M. Feroci, F. Frontera, E. Costa, L. Amati, M. Tavani, M. Rapisarda, & M. Orlandini.* 515, L9 (1999)

COTTON, W. D. The Radio-Optical Jet in NGC 3862 from Parsec to Subkiloparsec Scales. *L. Lara, L. Feretti, G. Giovannini, S. Baum, W. D. Cotton, C. P. O'Dea, & T. Venturi.* 513, 197 (1999)

COURBIN, F. The Redshift of the Gravitationally Lensed Radio Source PKS 1830−211. *C. Lidman, F. Courbin, G. Meylan, T. Broadhurst, B. Frye, & W. J. W. Welch.* 514, L57 (1999)

COURTEAU, STÉPHANE. Maximal Disks and the Tully-Fisher Relation. *Stéphane Courteau & Hans-Walter Rix.* 513, 561 (1999)

COVINGTON, J. Heating and Jet Formation by Hydrodynamic Cumulation in the Solar Atmosphere. *T. Tarbell, M. Ryutova, J. Covington, & A. Fludra.* 514, L47 (1999)

COVINO, STEFANO. The Active Corona of HD 35850 (F8 V). *Marc Gagné, Jeff A. Valenti, Jeffrey L. Linsky, Gianpiero Tagliaferri, Stefano Covino, & Manuel Güdel.* 515, 423 (1999)

COX, P. Water Ice, Silicate, and Polycyclic Aromatic Hydrocarbon Emission Features in the *Infrared Space Observatory* Spectrum of the Carbon-rich Planetary Nebula CPD −56°8032. *Martin Cohen, M. J. Barlow, R. J. Sylvester, X.-W. Liu, P. Cox, T. Lim, B. Schmitt, & A. K. Speck.* 513, L135 (1999)

COX, PIERRE. *Infrared Space Observatory*–Long Wavelength Spectrometer Detection of the 112 Micron HD $J = 1 \rightarrow 0$ Line toward the Orion Bar. *Christopher M. Wright, Ewine F. van Dishoeck, Pierre Cox, Sunil D. Sidher, & Martin F. Kessler.* 515, L29 (1999)

CRAMPTON, DAVID. The Canada-UK Deep Submillimeter Survey: First Submillimeter Images, the Source Counts, and Resolution of the Background. *Stephen Eales, Simon Lilly, Walter Gear, Loretta Dunne, J. Richard Bond, Francois Hammer, Olivier Le Fèvre, & David Crampton.* 515, 518 (1999)

CRANMER, S. R. Line-driven Ablation and Wind Tilting by External Irradiation. *K. G. Gayley, S. P. Owocki, & S. R. Cranmer.* 513, 442 (1999)

CRARY, D. J. See VAN DER HOOFT, F., et al. Hard X-Ray Variability of the Black Hole Candidate GRO J0422+32 during Its 1992 Outburst.

CRETTON, NICOLAS. Evidence for a Massive Black Hole in the S0 Galaxy NGC 4342. *Nicolas Cretton & Frank C. van den Bosch.* 514, 704 (1999)

CRISP, DAVID. See PAHRE, MICHAEL A., et al. Detection of Surface Brightness Fluctuations in NGC 4373 Using the *Hubble Space Telescope*.

See KRIST, JOHN E., et al. *Hubble Space Telescope* WFPC2 Imaging of XZ Tauri: Time Evolution of a Herbig-Haro Bow Shock.

CROFT, RUPERT A. C. Recovering the Primordial Density Fluctuations: A Comparison of Methods. *Vijay K. Narayanan & Rupert A. C. Croft.* 515, 471 (1999)

CROSAS, M. Counterrotating Nuclear Disks in Arp 220. *K. Sakamoto, N. Z. Scoville, M. S. Yun, M. Crosas, R. Genzel, & L. J. Tacconi.* 514, 68 (1999)

CRUDDACE, R. See DE GRANDI, S., et al. The X-Ray Luminosity Function of Bright Galaxy Clusters in the Local Universe.

See DE GRANDI, S., et al. A Flux-limited Sample of Bright Clusters of Galaxies from the Southern Part of the *ROSAT* All-Sky Survey: The Catalog and log *N*–log*S*.

CRUTCHER, R. M. The Magnetic Field of the NGC 2024 Molecular Cloud. *R. M. Crutcher, D. A. Roberts, T. H. Troland, & W. M. Goss.* 515, 275 (1999)

Detection of Magnetic Fields toward M17 through the H I Zeeman Effect. *C. L. Brogan, T. H. Troland, D. A. Roberts, & R. M. Crutcher.* 515, 304 (1999)

CRUTCHER, RICHARD M. Detection of the CN Zeeman Effect in Molecular Clouds. *Richard M. Crutcher, Thomas H. Troland, Bernard Lazareff, Gebriel Paubert, & Ilya Kazès.* 514, L121 (1999)

CUSERI, IOLANDA. Heating and Acceleration of the Solar Wind via Gravity Damping of Alfvén Waves. *Iolanda Cuseri, Dermott Mullan, Giancarlo Noci, & Giannina Poletto.* 514, 989 (1999)

CUSUMANO, G. See PIRO, L., et al. The X-Ray Afterglow of the Gamma-Ray Burst of 1997 May 8: Spectral Variability and Possible Evidence of an Iron Line.

CZERNY, BOZENA. A Comment on the Viscous Stability of Relativistic Keplerian Accretion Disks. *Rafal Moderski & Bozena Czerny.* 513, L123 (1999)

DA COSTA, L. N. Biasing and High-Order Statistics from the Southern-Sky Redshift Survey. *C. Benoist, A. Cappi, L. N. da Costa, S. Maurogordato, F. R. Bouchet, & R. Schaeffer.* 514, 563 (1999)

DAL FIUME, D. See PIRO, L., et al. The X-Ray Afterglow of the Gamma-Ray Burst of 1997 May 8: Spectral Variability and Possible Evidence of an Iron Line.

DAL FIUME, DANIELE. Hard X-Ray Radiation in the Coma Cluster Spectrum. *Roberto Fusco-Femiano, Daniele Dal Fiume, Luigina Feretti, Gabriele Giovannini, Paola Grandi, Giorgio Matt, Silvano Molendi, & Andrea Santangelo.* 513, L21 (1999)

DALGARNO, A. Quantum-mechanical Study of Ro-vibrational Transitions in H_2 Induced by He Atoms. *N. Balakrishnan, R. C. Forrey, & A. Dalgarno.* 514, 520 (1999)

Theoretical Modeling of *ISO* Results on Planetary Nebula NGC 7027. *Min Yan, S. R. Federman, A. Dalgarno, & J. E. Bjorkman.* 515, 640 (1999)

DALL'OGLIO, G. See ANDREANI, P., et al. The Enhancement and Decrement of the Sunyaev-Zeldovich Effect toward the *ROSAT* Cluster RX J0658−5557.

DANKS, ANTHONY C. The Distance to the Vela Supernova Remnant. *Alexandra N. Cha, Kenneth R. Sembach, & Anthony C. Danks.* 515, L25 (1999)

DAVID, L. Stellar Metallicities and Type Ia Supernova Rates in the Early-Type Galaxy NGC 5846 from *ROSAT* and *ASCA* Observations. *A. Finoguenov, C. Jones, W. Forman, & L. David.* 514, 844 (1999)

DAVIS, M. Streaming Velocities as a Dynamical Estimator of Ω. *P. G. Ferreira, R. Juszkiewicz, H. A. Feldman, M. Davis, & A. H. Jaffe.* 515, L1 (1999)

DEBATTISTA, VICTOR P. Warped Galaxies from Misaligned Angular Momenta. *Victor P. Debattista & J. A. Sellwood.* 513, L107 (1999)

DEFOREST, C. E. Slow Magnetosonic Waves in Coronal Plumes. *L. Ofman, V. M. Nakariakov, & C. E. DeForest.* 514, 441 (1999)

DE GRANDI, S. The X-Ray Luminosity Function of Bright Galaxy Clusters in the Local Universe. *S. De Grandi, L. Guzzo, H. Böhringer, S. Molendi, G. Chincarini, C. Collins, R. Cruddace, D. Neumann, S. Schindler, P. Schuecker, & W. Voges.* 513, L17 (1999)

A Flux-limited Sample of Bright Clusters of Galaxies from the Southern Part of the *ROSAT* All-Sky Survey: The Catalog and log *N*–log*S*. *S. De Grandi, H. Böhringer, L. Guzzo, S. Molendi, G. Chincarini, C. Collins, R. Cruddace, D. Neumann, S. Schindler, P. Schuecker, & W. Voges.* 514, 148 (1999)

DE KOOL, MARTIJN. Accretion Disk Reversal and the Spin-up/Spin-down of Accreting Pulsars. *James R. Murray, Martijn de Kool, & Jianke Li.* 515, 738 (1999)

DELABOUDINIÈRE, JEAN-PIERRE. Three-dimensional Stereoscopic Analysis of Solar Active Region Loops. I. *SOHO*/EIT Observations at Temperatures of (1.0–1.5) $\times 10^6$ K. *Markus J. Aschwanden, Jeffrey S. Newmark, Jean-Pierre Delaboudinière, Werner M. Neupert, J. A. Klimchuk, G. Allen Gary, Fabrice Portier-Fozzani, & Arik Zucker.* 515, 842 (1999)

DELLA CECA, ROBERTO. The REX Survey: A Search for Radio-emitting X-Ray Sources. *Alessandro Caccianiga, Tommaso Maccacaro, Anna Wolter, Roberto Della Ceca, & Isabella M. Gioia.* 513, 51 (1999)

ASCA Observations of the Starburst-driven Superwind Galaxy NGC 2146: Broadband (0.6–9 keV) Spectral Properties. *Roberto Della Ceca, Richard E. Griffiths, Timothy M. Heckman, Matthew D. Lehnert, & Kimberly A. Weaver.* 514, 772 (1999)

DEL VAL, J. A. Experimental Stark Widths and Shifts of Several Ne I Spectral Lines. *J. A. del Val, J. A. Aparicio, & S. Mar.* 513, 535 (1999)

DEMARQUE, PIERRE. The Ultraviolet Upturn in Elliptical Galaxies as an Age Indicator. *Sukyoung Yi, Young-Wook Lee, Jong-Hak Woo, Jang-Hyun Park, Pierre Demarque, & Augustus Oemler, Jr.* 513, 128 (1999)

DENISON, DAVID G. T. The Search for Solar Gravity-Mode Oscillations: An Analysis Using *Ulysses* Magnetic Field Data. *David G. T. Denison & Andrew T. Walden.* 514, 972 (1999)

DERMER, CHARLES D. Short-Timescale Variability in the External Shock Model of Gamma-Ray Bursts. *Charles D. Dermer & Kurt E. Mitman.* 513, L5 (1999)

Fireball Loading and the Blast-Wave Model of Gamma-Ray Bursts. *Charles D. Dermer, James Chiang, & Markus Böttcher.* 513, 656 (1999)

The External Shock Model of Gamma-Ray Bursts: Three Predictions and a Paradox Resolved. *Charles D. Dermer, Markus Böttcher, & James Chiang.* 515, L49 (1999)

DEVITO, B. Direct Spectroscopic Evidence for Ionized Polycyclic Aromatic Hydrocarbons in the Interstellar Medium. *G. C. Sloan, T. L. Hayward, L. J. Allamandola, J. D. Bregman, B. DeVito, & D. M. Hudgins.* 513, L65 (1999)

DEWDNEY, P. E. Radio Polarimetric Imaging of the Interstellar Medium: Magnetic Field and Diffuse Ionized Gas Structure near the W3/W4/W5/HB 3 Complex. *A. D. Gray, T. L. Landecker, P. E. Dewdney, A. R. Taylor, A. G. Willis, & M. Normandeau.* 514, 221 (1999)

DICKEL, JOHN R. Supernova Remnants in the Magellanic Clouds. II. Supernova Remnant Breakouts from N11L and N86. *Rosa Murphy Williams, You-Hua Chu, John R. Dickel, R. Chris Smith, Douglas K. Milne, & P. Frank Winkler.* 514, 798 (1999)

DIETERS, S. See HJELLMING, R. M., et al. Radio and X-Ray Observations of the 1998 Outburst of the Recurrent X-Ray Transient 4U 1630−47.

DIETERS, STEFAN. *Rossi X-Ray Timing Explorer* Observations of the Anomalous Pulsar 4U 0142+61. *Colleen A. Wilson, Stefan Dieters, Mark H. Finger, D. Matthew Scott, & Jan van Paradijs.* 513, 464 (1999)

DI FRANCESCO, JAMES. A High-Resolution Study of the Slowly Contracting, Starless Core L1544. *Jonathan P. Williams, Philip C. Myers, David J. Wilner, & James Di Francesco.* 513, L61 (1999)

DING, M. D. Simulation of Magnetic Reconnection with Heat Conduction. *P. F. Chen, C. Fang, Y. H. Tang, & M. D. Ding.* 513, 516 (1999)

DIRSCH, BORIS. Galactic Extinction from Colors and Counts of Field Galaxies in WFPC2 Frames: An Application to GRB 970228. *Rosa A. González, Andrew S. Fruchter, & Boris Dirsch.* 515, 69 (1999)

DOCOBO, J. A. Spectral, Photometric, and Polarimetric Study of Visual Binary COU 14. *V. S. Tamazian, J. A. Docobo, & N. D. Melikian.* 513, 933 (1999)

DONEA, A.-C. Seismic Images of a Solar Flare. *A.-C. Donea, D. C. Braun, & C. Lindsey.* 513, L143 (1999)

DONNELLY, R. HANK. A Hot Spot in Coma. *R. Hank Donnelly, M. Markevitch, W. Forman, C. Jones, E. Churazov, & M. Gilfanov.* 513, 690 (1999)

DOPITA, MICHAEL A. A Survey of Planetary Nebulae in the Southern Galactic Bulge. *Sylvie F. Beaulieu, Michael A. Dopita, & Kenneth C. Freeman.* 515, 610 (1999)

DOVE, JAMES B. *Rossi X-Ray Timing Explorer* Observation of Cygnus X-1. III. Implications for Compton Corona and Advection-dominated Accretion Flow Models. *Michael A. Nowak, Jörn Wilms, Brian A. Vaughan, James B. Dove, & Mitchell C. Begelman.* 515, 726 (1999)

DOWNES, D. Detection of CO (4–3), CO (9–8), and Dust Emission in the Broad Absorption Line Quasar APM 08279+5255 at a Redshift of 3.9. *D. Downes, R. Neri, T. Wiklind, D. J. Wilner, & P. A. Shaver.* 513, L1 (1999)

DRAGOVAN, MARK. Interferometric Observation of Cosmic Microwave Background Anisotropies. *Martin White, John E. Carlstrom, Mark Dragovan, & William L. Holzapfel.* 514, 12 (1999)

DRESSLER, ALAN. See PAHRE, MICHAEL A., et al. Detection of Surface Brightness Fluctuations in NGC 4373 Using the *Hubble Space Telescope*.

DRILLING, JOHN S. First Observations of an R Coronae Borealis Star with the Space Telescope Imaging Spectrograph: RY Sagittarii near Maximum Light. *Geoffrey C. Clayton, T. R. Ayres, Warrick A. Lawson, John S. Drilling, P. Woitke, & Martin Asplund.* 515, 351 (1999)

DUFOUR, R. J. Carbon in Spiral Galaxies from *Hubble Space Telescope* Spectroscopy. *D. R. Garnett, G. A. Shields, M. Peimbert, S. Torres-Peimbert, E. D. Skillman, R. J. Dufour, E. Terlevich, & R. J. Terlevich.* 513, 168 (1999)

DULTZIN-HACYAN, D. The Close Environment of Seyfert Galaxies and Its Implication for Unification Models. *D. Dultzin-Hacyan, Y. Krongold, I. Fuentes-Guridi, & P. Marziani.* 513, L111 (1999)

DUMONT, P. J. See BODEN, A. F., et al. The Visual Orbit of ι Pegasi.

DUNNE, LORETTA. The Canada-UK Deep Submillimeter Survey: First Submillimeter Images, the Source Counts, and Resolution of the Background. *Stephen Eales, Simon Lilly, Walter Gear, Loretta Dunne, J. Richard Bond, Francois Hammer, Olivier Le Fèvre, & David Crampton.* 515, 518 (1999)

DUROUCHOUX, P. See HJELLMING, R. M., et al. Radio and X-Ray Observations of the 1998 Outburst of the Recurrent X-Ray Transient 4U 1630−47.

EALES, STEPHEN. The Canada-UK Deep Submillimeter Survey: First Submillimeter Images, the Source Counts, and Resolution of the Background. *Stephen Eales, Simon Lilly, Walter Gear, Loretta Dunne, J. Richard Bond, Francois Hammer, Olivier Le Fèvre, & David Crampton.* 515, 518 (1999)

EDELSON, RICK. A Cutoff in the X-Ray Fluctuation Power Density Spectrum of the Seyfert 1 Galaxy NGC 3516. *Rick Edelson & Kirpal Nandra.* 514, 682 (1999)

EGAMI, E. High Spatial Resolution Imaging of Arp 220 from 3 to 25 Microns. *B. T. Soifer, G. Neugebauer, K. Matthews, E. E. Becklin, M. Ressler, M. W. Werner, A. J. Weinberger, & E. Egami.* 513, 207 (1999)

EHGAMBERDIEV, SHUHRAT. See CHOU, DEAN-YI, et al. Acoustic Imaging in Helioseismology.

ELITZUR, MOSHE. Megamaser Disks in Active Galactic Nuclei. *John F. Kartje, Arieh Königl, & Moshe Elitzur.* 513, 180 (1999)

ELIZONDO, D. Self-regulating Galaxy Formation as an Explanation for the Tully-Fisher Relation. *D. Elizondo, G. Yepes, R. Kates, V. Müller, & A. Klypin.* 515, 525 (1999)

ELLISON, DONALD C. Radio to Gamma-Ray Emission from Shell-Type Supernova Remnants: Predictions from Nonlinear Shock Acceleration Models. *Matthew G. Baring, Donald C. Ellison, Stephen P. Reynolds, Isabelle A. Grenier, & Philippe Goret.* 513, 311 (1999)

ELMEGREEN, BRUCE G. The Stellar Initial Mass Function from Random Sampling in Hierarchical Clouds. II. Statistical Fluctuations and a Mass Dependence for Starbirth Positions and Times. *Bruce G. Elmegreen.* 515, 323 (1999)

ELSTON, RICHARD. Lack of Iron Abundance Evolution in High-Redshift QSOs. *Keith L. Thompson, Gary J. Hill, & Richard Elston.* 515, 487 (1999)

ENCRENAZ, T. Detection of the Methyl Radical on Neptune. *B. Bézard, P. N. Romani, H. Feuchtgruber, & T. Encrenaz.* 515, 868 (1999)

ERICKSON, LANCE K. Satellites as Probes of the Masses of Spiral Galaxies. *Lance K. Erickson, S. T. Gottesman, & James H. Hunter, Jr.* 515, 153 (1999)

ERIGUCHI, YOSHIHARU. A Numerical Study of Normal Modes of Rotating Neutron Star Models by the Cowling Approximation. *Shin'ichirou Yoshida & Yoshiharu Eriguchi.* 515, 414 (1999)

ESPEY, B. R. See SAVAGLIO, S., et al. The Lyα Forest of the Quasar in the Hubble Deep Field South.

EVANS, A. S. See FRAYER, D. T., et al. Molecular Gas in the $z = 2.565$ Submillimeter Galaxy SMM J14011+0252.

EVANS, ROBIN W. See KRIST, JOHN E., et al. *Hubble Space Telescope* WFPC2 Imaging of XZ Tauri: Time Evolution of a Herbig-Haro Bow Shock.

FABIAN, ANDREW C. X-Ray Iron Line Reverberation from Black Hole Accretion Disks. *Chistopher S. Reynolds, Andrew J. Young, Mitchell C. Begelman, & Andrew C. Fabian.* 514, 164 (1999)

FALCKE, HEINO. A Major Radio Outburst in III Zw 2 with an Extremely Inverted, Millimeter-peaked Spectrum. *Heino Falcke, Geoffrey C. Bower, Andrew P. Lobanov, Thomas P. Krichbaum, Alok R. Patnaik, Margo F.*

Aller, Hugh D. Aller, Harri Teräsranta, Melvyn C. H. Wright, & Göran Sandell. 514, L17 (1999)

FANG, C. Simulation of Magnetic Reconnection with Heat Conduction. *P. F. Chen, C. Fang, Y. H. Tang, & M. D. Ding.* 513, 516 (1999)

FEDERMAN, S. R. Theoretical Modeling of *ISO* Results on Planetary Nebula NGC 7027. *Min Yan, S. R. Federman, A. Dalgarno, & J. E. Bjorkman.* 515, 640 (1999)

FEIBELMAN, WALTER A. Changes and Absorption Features in the Ultraviolet Spectrum of the PG 1159–Type Central Star RX J2117+3412. *Walter A. Feibelman.* 513, 947 (1999)

A Detailed Analysis of the Stellar and Nebular *IUE* Spectrum of the Peculiar "O VI Sequence" Planetary Nebula NGC 40. *Walter A. Feibelman.* 514, 296 (1999)

Spectroscopic Observations of the Planetary Nebula NGC 6818. *Siek Hyung, Lawrence H. Aller, & Walter A. Feibelman.* 514, 878 (1999)

FELDMAN, H. A. Streaming Velocities as a Dynamical Estimator of Ω. *P. G. Ferreira, R. Juszkiewicz, H. A. Feldman, M. Davis, & A. H. Jaffe.* 515, L1 (1999)

FENG, Y. X. X-Ray Shots of Cygnus X-1. *Y. X. Feng, T. P. Li, & L. Chen.* 514, 373 (1999)

FERETTI, L. The Radio-Optical Jet in NGC 3862 from Parsec to Subkiloparsec Scales. *L. Lara, L. Feretti, G. Giovannini, S. Baum, W. D. Cotton, C. P. O'Dea, & T. Venturi.* 513, 197 (1999)

FERETTI, LUIGINA. Hard X-Ray Radiation in the Coma Cluster Spectrum. *Roberto Fusco-Femiano, Daniele Dal Fiume, Luigina Feretti, Gabriele Giovannini, Paola Grandi, Giorgio Matt, Silvano Molendi, & Andrea Santangelo.* 513, L21 (1999)

FERGUSON, H. C. See SAVAGLIO, S., et al. The Lyα Forest of the Quasar in the Hubble Deep Field South.

FERLAND, G. J. The PG X-Ray QSO Sample: Links between the Ultraviolet–X-Ray Continuum and Emission Lines. *Beverley J. Wills, A. Laor, M. S. Brotherton, D. Wills, B. J. Wilkes, G. J. Ferland, & Zhaohui Shang.* 515, L53 (1999)

FERNÁNDEZ-SOTO, ALBERTO. A New Catalog of Photometric Redshifts in the Hubble Deep Field. *Alberto Fernández-Soto, Kenneth M. Lanzetta, & Amos Yahil.* 513, 34 (1999)

FEROCI, M. See PIRO, L., et al. The X-Ray Afterglow of the Gamma-Ray Burst of 1997 May 8: Spectral Variability and Possible Evidence of an Iron Line.

A Giant Outburst from SGR 1900+14 Observed with the *BeppoSAX* Gamma-Ray Burst Monitor. *M. Feroci, F. Frontera, E. Costa, L. Amati, M. Tavani, M. Rapisarda, & M. Orlandini.* 515, L9 (1999)

FERRARA, ANDREA. Starburst-driven Mass Loss from Dwarf Galaxies: Efficiency and Metal Ejection. *Mordecai-Mark Mac Low & Andrea Ferrara.* 513, 142 (1999)

FERRARESE, LAURA. See KELSON, DANIEL D., et al. The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XIX. The Discovery of Cepheids in and a New Distance to NGC 3198.

See SILBERMANN, N. A., et al. The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XIV. The Cepheids in NGC 1365.

See MADORE, BARRY F., et al. The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XV. A Cepheid Distance to the Fornax Cluster and Its Implications.

Nuclear Disks of Gas and Dust in Early-Type Galaxies and the Hunt for Massive Black Holes: *Hubble Space Telescope* Observations of NGC 6251. *Laura Ferrarese & Holland C. Ford.* 515, 583 (1999)

FERREIRA, P. G. Streaming Velocities as a Dynamical Estimator of Ω. *P. G. Ferreira, R. Juszkiewicz, H. A. Feldman, M. Davis, & A. H. Jaffe.* 515, L1 (1999)

FESEN, ROBERT A. *Hubble Space Telescope* Images and Spectra of the Remnant of SN 1885 in M31. *Robert A. Fesen, Christopher L. Gerardy, Kevin M. McLin, & Andrew J. S. Hamilton.* 514, 195 (1999)

FEUCHTGRUBER, H. Detection of the Methyl Radical on Neptune. *B. Bézard, P. N. Romani, H. Feuchtgruber, & T. Encrenaz.* 515, 868 (1999)

FICH, MICHEL. See WILSON, CHRISTINE D., et al. Submillimeter Continuum Emission in the ρ Ophiuchi Molecular Cloud: Filaments, Arcs, and an Unidentified Far-Infrared Object.

FIELD, GEORGE B. Nonlinear α-Effect in Dynamo Theory. *George B. Field, Eric G. Blackman, & Hongsong Chou.* 513, 638 (1999)

FIELDS, BRIAN D. Testing the Relation between the Local and Cosmic Star Formation Histories. *Brian D. Fields.* 515, 603 (1999)

FIGER, DONALD F. Massive Stars in the Quintuplet Cluster. *Donald F. Figer, Ian S. McLean, & Mark Morris.* 514, 202 (1999)

FILIPPENKO, ALEXEI V. Polarized Broad Hα Emission from the LINER Nucleus of NGC 1052. *Aaron J. Barth, Alexei V. Filippenko, & Edward C. Moran.* 515, L61 (1999)

FINGER, M. H. See VAN DER HOOFT, F., et al. Hard X-Ray Variability of the Black Hole Candidate GRO J0422+32 during Its 1992 Outburst.

FINGER, MARK H. *Rossi X-Ray Timing Explorer* Observations of the Anomalous Pulsar 4U 0142+61. *Colleen A. Wilson, Stefan Dieters, Mark H. Finger, D. Matthew Scott, & Jan van Paradijs.* 513, 464 (1999)

FINOGUENOV, A. Stellar Metallicities and Type Ia Supernova Rates in the Early-Type Galaxy NGC 5846 from *ROSAT* and *ASCA* Observations. *A. Finoguenov, C. Jones, W. Forman, & L. David.* 514, 844 (1999)

FISHER, GEORGE H. The Solar Flare Soft X-Ray Differential Emission Measure and the Neupert Effect at Different Temperatures. *James M. McTiernan, George H. Fisher, & Peng Li.* 514, 472 (1999)

FLUDRA, A. Heating and Jet Formation by Hydrodynamic Cumulation in the Solar Atmosphere. *T. Tarbell, M. Ryutova, J. Covington, & A. Fludra.* 514, L47 (1999)

FOLTZ, C. B. A Statistical Study of Rest-Frame Optical Emission Properties in Luminous Quasars at $2.0 \leq z \leq 2.5$. *D. H. McIntosh, M. J. Rieke, H.-W. Rix, C. B. Foltz, & R. J. Weymann.* 514, 40 (1999)

FORD, ERIC B. Structure and Evolution of Nearby Stars with Planets. I. Short-Period Systems. *Eric B. Ford, Frederic A. Rasio, & Alison Sills.* 514, 411 (1999)

FORD, ERIC C. Discovery of Microsecond Soft Lags in the X-Ray Emission of the Atoll Source 4U 1636−536. *Philip Kaaret, Santina Piraino, Eric C. Ford, & Andrea Santangelo.* 514, L31 (1999)

FORD, HOLLAND. See SILBERMANN, N. A., et al. The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XIV. The Cepheids in NGC 1365.

FORD, HOLLAND C. See KELSON, DANIEL D., et al. The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XIX. The Discovery of Cepheids in and a New Distance to NGC 3198.

Nuclear Disks of Gas and Dust in Early-Type Galaxies and the Hunt for Massive Black Holes: *Hubble Space Telescope* Observations of NGC 6251. *Laura Ferrarese & Holland C. Ford.* 515, 583 (1999)

FORMAN, W. A Hot Spot in Coma. *R. Hank Donnelly, M. Markevitch, W. Forman, C. Jones, E. Churazov, & M. Gilfanov.* 513, 690 (1999)

Stellar Metallicities and Type Ia Supernova Rates in the Early-Type Galaxy NGC 5846 from *ROSAT* and *ASCA* Observations. *A. Finoguenov, C. Jones, W. Forman, & L. David.* 514, 844 (1999)

FORKEY, R. C. Quantum-mechanical Study of Ro-vibrational Transitions in H_2 Induced by He Atoms. *N. Balakrishnan, R. C. Forrey, & A. Dalgarno.* 514, 520 (1999)

FRANCO, JOSÉ. The Collisions of High-Velocity Clouds with a Magnetized Gaseous Galactic Disk. *Alfredo Santillán, José Franco, Marco Martos, & Jongsoo Kim.* 515, 657 (1999)

FRANX, MARIJN. Velocity Dispersion of the Gravitational Lens 0957+561. *John L. Tonry & Marijn Franx.* 515, 512 (1999)

FRAYER, D. T. Molecular Gas in the $z = 2.565$ Submillimeter Galaxy SMM J14011+0252. *D. T. Frayer, R. J. Ivison, N. Z. Scoville, A. S. Evans, M. S. Yun, Ian Smail, A. J. Barger, A. W. Blain, & J.-P. Kneib.* 514, L13 (1999)

FREEDMAN, RICHARD. Reflected Spectra and Albedos of Extrasolar Giant Planets. I. Clear and Cloudy Atmospheres. *Mark S. Marley, Christopher Gelino, Denise Stephens, Jonathan I. Lunine, & Richard Freedman.* 513, 879 (1999)

FREEDMAN, WENDY L. See KELSON, DANIEL D., et al. The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XIX. The Discovery of Cepheids in and a New Distance to NGC 3198.

See GALLART, CARME, et al. *Hubble Space Telescope* Observations of the Local Group Dwarf Galaxy Leo I.

See SILBERMANN, N. A., et al. The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XIV. The Cepheids in NGC 1365.

FREEMAN, KEN. Large Stellar Disks in Small Elliptical Galaxies. *Hans-Walter Rix, C. Marcella Carollo, & Ken Freeman.* 513, L25 (1999)

FREEMAN, KENNETH C. A Survey of Planetary Nebulae in the Southern Galactic Bulge. *Sylvie F. Beaulieu, Michael A. Dopita, & Kenneth C. Freeman.* 515, 610 (1999)

FREEMAN, WENDY L. See MADORE, BARRY F., et al. The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XV. A Cepheid Distance to the Fornax Cluster and Its Implications.

FREYTAG, BERND. Stellar Envelope Convection Calibrated by Radiation Hydrodynamics Simulations: Influence on Globular Cluster Isochrones. *Bernd Freytag & Maurizio Salaris.* 513, L49 (1999)

FRONTERA, F. See PIRO, L., et al. The X-Ray Afterglow of the Gamma-Ray Burst of 1997 May 8: Spectral Variability and Possible Evidence of an Iron Line.
A Giant Outburst from SGR 1900+14 Observed with the *BeppoSAX* Gamma-Ray Burst Monitor. *M. Feroci, F. Frontera, E. Costa, L. Amati, M. Tavani, M. Rapisarda, & M. Orlandini.* 515, L9 (1999)

FRUCHTER, ANDREW S. Galactic Extinction from Colors and Counts of Field Galaxies in WFPC2 Frames: An Application to GRB 970228. *Rosa A. González, Andrew S. Fruchter, & Boris Dirsch.* 515, 69 (1999)

FRYE, B. The Redshift of the Gravitationally Lensed Radio Source PKS 1830−211. *C. Lidman, F. Courbin, G. Meylan, T. Broadhurst, B. Frye, & W. J. W. Welch.* 514, L57 (1999)

FUENTES-GURIDI, I. The Close Environment of Seyfert Galaxies and Its Implication for Unification Models. *D. Dultzin-Hacyan, Y. Krongold, I. Fuentes-Guridi, & P. Marziani.* 513, L111 (1999)

FUSCO-FEMIANO, ROBERTO. Hard X-Ray Radiation in the Coma Cluster Spectrum. *Roberto Fusco-Femiano, Daniele Dal Fiume, Luigina Feretti, Gabriele Giovannini, Paola Grandi, Giorgio Matt, Silvano Molendi, & Andrea Santangelo.* 513, L21 (1999)

GAGNÉ, MARC. The Active Corona of HD 35850 (F8 V). *Marc Gagné, Jeff A. Valenti, Jeffrey L. Linsky, Gianpiero Tagliaferri, Stefano Covino, & Manuel Güdel.* 515, 423 (1999)

GALLAGHER, JOHN S., III. Evolutionary Status of Dwarf "Transition" Galaxies. *Patricia M. Knezek, Kenneth R. Sembach, & John S. Gallagher III.* 514, 119 (1999)
See PAHRE, MICHAEL A., et al. Detection of Surface Brightness Fluctuations in NGC 4373 Using the *Hubble Space Telescope*.

GALLART, CARME. *Hubble Space Telescope* Observations of the Local Group Dwarf Galaxy Leo I. *Carme Gallart, Wendy L. Freedman, Mario Mateo, Cesare Chiosi, Ian B. Thompson, Antonio Aparicio, Gianpaolo Bertelli, Paul W. Hodge, Myung G. Lee, Edward W. Olszewski, Abhijit Saha, Peter B. Stetson, & Nicholas B. Suntzeff.* 514, 665 (1999)

GALLEGHER, JOHN S., III. See KRIST, JOHN E., et al. *Hubble Space Telescope* WFPC2 Imaging of XZ Tauri: Time Evolution of a Herbig-Haro Bow Shock.

GAMMIE, CHARLES F. Kinetic and Structural Evolution of Self-gravitating, Magnetized Clouds: 2.5-dimensional Simulations of Decaying Turbulence. *Eve C. Ostriker, Charles F. Gammie, & James M. Stone.* 513, 259 (1999)

GARAY, GUIDO. Disk and Ouflow in Cepheus A–HW2: Interferometric SiO and HCO^+ Observations. *José F. Gómez, Anneila I. Sargent, José M. Torrelles, Paul T. P. Ho, Luis F. Rodríguez, Jorge Cantó, & Guido Garay.* 514, 287 (1999)

GARCÍA-BERRO, ENRIQUE. On the Evolution of Stars that Form Electron-degenerate Cores Processed by Carbon Burning. V. Shell Convection Sustained by Helium Burning, Transient Neon Burning, Dredge-out, Urca Cooling, and Other Properties of an 11 $M_\odot$ Population I Model Star. *Claudio Ritossa, Enrique García-Berro, & Icko Iben, Jr.* 515, 381 (1999)

GARCÍA-LARIO, PEDRO. *Infrared Space Observatory* Observations of IRAS 16594−4656: A New Proto–Planetary Nebula with a Strong 21 Micron Dust Feature. *Pedro García-Lario, Arturo Manchado, Ana Ulla, & Minia Manteiga.* 513, 941 (1999)

GARCÍA-VARGAS, MARÍA LUISA. Multiwavelength Study of the Starburst Galaxy NGC 7714. I. Ultraviolet-Optical Spectroscopy. *Rosa M. González Delgado, María Luisa García-Vargas, Jeff Goldader, Claus Leitherer, & Anna Pasquali.* 513, 707 (1999)

GARNETT, D. R. Carbon in Spiral Galaxies from *Hubble Space Telescope* Spectroscopy. *D. R. Garnett, G. A. Shields, M. Peimbert, S. Torres-Peimbert, E. D. Skillman, R. J. Dufour, E. Terlevich, & R. J. Terlevich.* 513, 168 (1999)

GARY, G. ALLEN. Three-dimensional Stereoscopic Analysis of Solar Active Region Loops. I. *SOHO*/EIT Observations at Temperatures of (1.0–1.5) $\times 10^6$ K. *Markus J. Aschwanden, Jeffrey S. Newmark, Jean-Pierre Delaboudinière, Werner M. Neupert, J. A. Klimchuk, G. Allen Gary, Fabrice Portier-Fozzani, & Arik Zucker.* 515, 842 (1999)

GAUDI, B. SCOTT. Spectrophotometric Resolution of Stellar Surfaces with Microlensing. *B. Scott Gaudi & Andrew Gould.* 513, 619 (1999)

GAYLEY, K. G. Line-driven Ablation and Wind Tilting by External Irradiation. *K. G. Gayley, S. P. Owocki, & S. R. Cranmer.* 513, 442 (1999)

GEAR, WALTER. The Canada-UK Deep Submillimeter Survey: First Submillimeter Images, the Source Counts, and Resolution of the Background. *Stephen Eales, Simon Lilly, Walter Gear, Loretta Dunne, J. Richard Bond, Francois Hammer, Olivier Le Fèvre, & David Crampton.* 515, 518 (1999)

GEHRELS, N. A Gamma-Ray Flare from PKS 2255−282. *D. J. Macomb, N. Gehrels, & C. R. Shrader.* 513, 652 (1999)

GEHRELS, NEIL. The Progenitor of the New COMPTEL/*ROSAT* Supernova Remnant in Vela. *Wan Chen & Neil Gehrels.* 514, L103 (1999)

GELINO, CHRISTOPHER. Reflected Spectra and Albedos of Extrasolar Giant Planets. I. Clear and Cloudy Atmospheres. *Mark S. Marley, Christopher Gelino, Denise Stephens, Jonathan I. Lunine, & Richard Freedman.* 513, 879 (1999)

GENZEL, R. Counterrotating Nuclear Disks in Arp 220. *K. Sakamoto, N. Z. Scoville, M. S. Yun, M. Crosas, R. Genzel, & L. J. Tacconi.* 514, 68 (1999)

GERARDY, CHRISTOPHER L. *Hubble Space Telescope* Images and Spectra of the Remnant of SN 1885 in M31. *Robert A. Fesen, Christopher L. Gerardy, Kevin M. McLin, & Andrew J. S. Hamilton.* 514, 195 (1999)

GHISELLINI, GABRIELE. *ASCA* and Contemporaneous Ground-based Observations of the BL Lacertae Objects 1749+096 and 2200+420 (BL Lac). *Rita M. Sambruna, Gabriele Ghisellini, Eric Hooper, R. I. Kollgaard, Joseph E. Pesce, & C. Megan Urry.* 515, 140 (1999)

GIBSON, BRAD K. See KELSON, DANIEL D., et al. The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XIX. The Discovery of Cepheids in and a New Distance to NGC 3198.
See SILBERMANN, N. A., et al. The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XIV. The Cepheids in NGC 1365.
See MADORE, BARRY F., et al. The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XV. A Cepheid Distance to the Fornax Cluster and Its Implications.

GILFANOV, M. A Hot Spot in Coma. *R. Hank Donnelly, M. Markevitch, W. Forman, C. Jones, E. Churazov, & M. Gilfanov.* 513, 690 (1999)

GILLILAND, RONALD L. *Hubble Space Telescope* Fine Guidance Sensor Astrometric Parallaxes for Three Dwarf Novae: SS Aurigae, SS Cygni, and U Geminorum. *Thomas E. Harrison, Bernard J. McNamara, Paula Szkody, Barbara E. McArthur, G. F. Benedict, Arnold R. Klemola, & Ronald L. Gilliland.* 515, L93 (1999)

GIOIA, ISABELLA M. The REX Survey: A Search for Radio-emitting X-Ray Sources. *Alessandro Caccianiga, Tommaso Maccacaro, Anna Wolter, Roberto Della Ceca, & Isabella M. Gioia.* 513, 51 (1999)

GIOVANNINI, G. The Radio-Optical Jet in NGC 3862 from Parsec to Subkiloparsec Scales. *L. Lara, L. Feretti, G. Giovannini, S. Baum, W. D. Cotton, C. P. O'Dea, & T. Venturi.* 513, 197 (1999)

GIOVANNINI, GABRIELE. Hard X-Ray Radiation in the Coma Cluster Spectrum. *Roberto Fusco-Femiano, Daniele Dal Fiume, Luigina Feretti, Gabriele Giovannini, Paola Grandi, Giorgio Matt, Silvano Molendi, & Andrea Santangelo.* 513, L21 (1999)

GNEDIN, OLEG Y. On the Self-consistent Response of Stellar Systems to Gravitational Shocks. *Oleg Y. Gnedin & Jeremiah P. Ostriker.* 513, 626 (1999)
Tidal Shocking by Extended Mass Distributions. *Oleg Y. Gnedin, Lars Hernquist, & Jeremiah P. Ostriker.* 514, 109 (1999)

GOLDADER, JEFF. Multiwavelength Study of the Starburst Galaxy NGC 7714. I. Ultraviolet-Optical Spectroscopy. *Rosa M. González Delgado, María Luisa García-Vargas, Jeff Goldader, Claus Leitherer, & Anna Pasquali.* 513, 707 (1999)

GOLDADER, JEFFREY D. Evolutionary Synthesis Modeling of Red Supergiant Features in the Near-Infrared. *Livia Origlia, Jeffrey D. Goldader, Claus Leitherer, Daniel Schaerer, & Ernesto Oliva.* 514, 96 (1999)

GÓMEZ, JOSÉ F. Disk and Ouflow in Cepheus A–HW2: Interferometric SiO and HCO^+ Observations. *José F. Gómez, Anneila I. Sargent, José M. Torrelles, Paul T. P. Ho, Luis F. Rodríguez, Jorge Cantó, & Guido Garay.* 514, 287 (1999)

GÓMEZ, YOLANDA. Radio Continuum and Recombination Line Observations of the Polypolar Planetary Nebula NGC 2440. *Roberto Vázquez, José M. Torrelles, Luis F. Rodríguez, Yolanda Gómez, J. Alberto López, & Luis F. Miranda.* 515, 633 (1999)

GONZÁLEZ, ROSA A. Galactic Extinction from Colors and Counts of Field Galaxies in WFPC2 Frames: An Application to GRB 970228. *Rosa A. González, Andrew S. Fruchter, & Boris Dirsch.* 515, 69 (1999)

GONZÁLEZ DELGADO, ROSA M. Multiwavelength Study of the Starburst Galaxy NGC 7714. I. Ultraviolet-Optical Spectroscopy. *Rosa M. González Delgado, María Luisa García-Vargas, Jeff Goldader, Claus Leitherer, & Anna Pasquali.* 513, 707 (1999)

GOODE, PHILIP. See CHOU, DEAN-YI, et al. Acoustic Imaging in Helioseismology.

GOODE, PHILIP R. Extreme-Ultraviolet Jets and Hα Surges in Solar Microflares. *Jongchul Chae, Jiong Qiu, Haimin Wang, & Philip R. Goode.* 513, L75 (1999)

GORANSKIJ, VITALY P. The Mode Change of the RR Lyrae Variable V79 in M3. *Christine M. Clement & Vitaly P. Goranskij.* 513, 767 (1999)

GORDON, KARL D. A Reanalysis of the Ultraviolet Extinction from Interstellar Dust in the Large Magellanic Cloud. *K. A. Misselt, Geoffrey C. Clayton, & Karl D. Gordon.* 515, 128 (1999)

GORET, PHILIPPE. Radio to Gamma-Ray Emission from Shell-Type Supernova Remnants: Predictions from Nonlinear Shock Acceleration Models. *Matthew G. Baring, Donald C. Ellison, Stephen P. Reynolds, Isabelle A. Grenier, & Philippe Goret.* 513, 311 (1999)

GOSS, W. M. A High-Resolution VLA and Optical Study of NGC 604. *E. Churchwell & W. M. Goss.* 514, 188 (1999)

G359.87+0.18, An FR II Radio Galaxy 15′ from Sagittarius A*: Implications for the Scattering Region in the Galactic Center. *T. Joseph W. Lazio, K. R. Anantharamaiah, W. M. Goss, Namir E. Kassim, & James M. Cordes.* 515, 196 (1999)

The Magnetic Field of the NGC 2024 Molecular Cloud. *R. M. Crutcher, D. A. Roberts, T. H. Troland, & W. M. Goss.* 515, 275 (1999)

GOTTESMAN, S. T. Satellites as Probes of the Masses of Spiral Galaxies. *Lance K. Erickson, S. T. Gottesman, & James H. Hunter, Jr.* 515, 153 (1999)

GOTTHELF, E. V. X-Ray Variability from the Compact Source in the Supernova Remnant RCW 103. *E. V. Gotthelf, R. Petre, & G. Vasisht.* 514, L107 (1999)

GOTTLIEB, C. A. Laboratory Detection of the Ring-Chain Carbenes HC_4N and HC_6N. *M. C. McCarthy, J.-U. Grabow, M. J. Travers, W. Chen, C. A. Gottlieb, & P. Thaddeus.* 513, 305 (1999)

GOULD, ANDREW. Spectrophotometric Resolution of Stellar Surfaces with Microlensing. *B. Scott Gaudi & Andrew Gould.* 513, 619 (1999)

Microlens Parallaxes with *SIRTF*. *Andrew Gould.* 514, 869 (1999)

A Precision Test of *Hipparcos* Systematics toward the Hyades. *Vijay K. Narayanan & Andrew Gould.* 515, 256 (1999)

GRABOW, J.-U. Laboratory Detection of the Ring-Chain Carbenes HC_4N and HC_6N. *M. C. McCarthy, J.-U. Grabow, M. J. Travers, W. Chen, C. A. Gottlieb, & P. Thaddeus.* 513, 305 (1999)

GRAHAM, JOHN A. See KELSON, DANIEL D., et al. The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XIX. The Discovery of Cepheids in and a New Distance to NGC 3198.

See SILBERMANN, N. A., et al. The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XIV. The Cepheids in NGC 1365.

See MADORE, BARRY F., et al. The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XV. A Cepheid Distance to the Fornax Cluster and Its Implications.

GRAHAM, MATTHEW J. A New Assessment of the Completeness of Quasar Surveys: Implications for the Luminosity Function. *Matthew J. Graham, Roger G. Clowes, & Luis E. Campusano.* 513, 69 (1999)

GRANDI, PAOLA. Hard X-Ray Radiation in the Coma Cluster Spectrum. *Roberto Fusco-Femiano, Daniele Dal Fiume, Luigina Feretti, Gabriele Giovannini, Paola Grandi, Giorgio Matt, Silvano Molendi, & Andrea Santangelo.* 513, L21 (1999)

GRANOT, JONATHAN. Images and Spectra from the Interior of a Relativistic Fireball. *Jonathan Granot, Tsvi Piran, & Re'em Sari.* 513, 679 (1999)

GRAY, A. D. Radio Polarimetric Imaging of the Interstellar Medium: Magnetic Field and Diffuse Ionized Gas Structure near the W3/W4/W5/HB 3 Complex. *A. D. Gray, T. L. Landecker, P. E. Dewdney, A. R. Taylor, A. G. Willis, & M. Normandeau.* 514, 221 (1999)

GREELEY, BRADFORD W. The Far-Ultraviolet Spectrum and Short-Timescale Variability of AM Herculis from Observations with the Hopkins Ultraviolet Telescope. *Bradford W. Greeley, William P. Blair, Knox S. Long, & John C. Raymond.* 513, 491 (1999)

GREEN, ANNE J. The "Rabbit": A Potential Radio Counterpart of GeV J1417−6100. *Mallory S. E. Roberts, Roger W. Romani, Simon Johnston, & Anne J. Green.* 515, 712 (1999)

GREEN, PAUL J. Investigation of the Relation between the Spectral Energy Distributions and the Emission Lines in Low-Redshift Quasars. *Belinda J. Wilkes, Joanna Kuraszkiewicz, Paul J. Green, Smita Mathur, & Jonathan C. McDowell.* 513, 76 (1999)

GREEN, RICHARD F. Compact Nuclei in Galaxies at Moderate Redshift. II. Their Nature and Implications for the Active Galactic Nucleus Luminosity Function. *Vicki L. Sarajedini, Richard F. Green, Richard E. Griffiths, & Kavan Ratnatunga.* 514, 746 (1999)

GREGG, MICHAEL D. Discovery of a Radio-loud/Radio-quiet Binary Quasar. *M. S. Brotherton, Michael D. Gregg, R. H. Becker, S. A. Laurent-Muehleisen, R. L. White, & S. A. Stanford.* 514, L61 (1999)

GREGGIO, LAURA. Objects in NGC 205 Resolved into Stellar Associations by *Hubble Space Telescope* Ultraviolet Imaging. *Michele Cappellari, Francesco Bertola, David Burstein, Lucio M. Buson, Laura Greggio, & Alvio Renzini.* 515, L17 (1999)

GRENIER, ISABELLE A. Radio to Gamma-Ray Emission from Shell-Type Supernova Remnants: Predictions from Nonlinear Shock Acceleration Models. *Matthew G. Baring, Donald C. Ellison, Stephen P. Reynolds, Isabelle A. Grenier, & Philippe Goret.* 513, 311 (1999)

GRIFFITHS, RICHARD E. Compact Nuclei in Galaxies at Moderate Redshift. II. Their Nature and Implications for the Active Galactic Nucleus Luminosity Function. *Vicki L. Sarajedini, Richard F. Green, Richard E. Griffiths, & Kavan Ratnatunga.* 514, 746 (1999)

ASCA Observations of the Starburst-driven Superwind Galaxy NGC 2146: Broadband (0.6–9 keV) Spectral Properties. *Roberto Della Ceca, Richard E. Griffiths, Timothy M. Heckman, Matthew D. Lehnert, & Kimberly A. Weaver.* 514, 772 (1999)

See PAHRE, MICHAEL A., et al. Detection of Surface Brightness Fluctuations in NGC 4373 Using the *Hubble Space Telescope*.

See KRIST, JOHN E., et al. *Hubble Space Telescope* WFPC2 Imaging of XZ Tauri: Time Evolution of a Herbig-Haro Flow Shock.

GRILLMAIR, CARL J. See PAHRE, MICHAEL A., et al. Detection of Surface Brightness Fluctuations in NGC 4373 Using the *Hubble Space Telescope*.

GU, Q. S. New Wolf-Rayet Galaxies with Detection of WC Stars. *J. H. Huang, Q. S. Gu, L. Ji, W. D. Li, J. Y. Wei, & W. Zheng.* 513, 215 (1999)

GUBLER, J. See BODEN, A. F., et al. The Visual Orbit of ι Pegasi.

GÜDEL, MANUEL. Implications from Extreme-Ultraviolet Observations for Coronal Heating of Active Stars. *Marc Audard, Manuel Güdel, & Edward F. Guinan.* 513, L53 (1999)

The Active Corona of HD 35850 (F8 V). *Marc Gagné, Jeff A. Valenti, Jeffrey L. Linsky, Gianpiero Tagliaferri, Stefano Covino, & Manuel Güdel.* 515, 423 (1999)

GUINAN, EDWARD F. Implications from Extreme-Ultraviolet Observations for Coronal Heating of Active Stars. *Marc Audard, Manuel Güdel, & Edward F. Guinan.* 513, L53 (1999)

GUPTA, YASHWANT. Long-Term Scintillation Studies of Pulsars. II. Refractive Effects and the Spectrum of Plasma Density Fluctuations. *N. D. Ramesh Bhat, Yashwant Gupta, & A. Pramesh Rao.* 514, 249 (1999)

Long-Term Scintillation Studies of Pulsars. III. Testing Theoretical Models of Refractive Scintillation. *N. D. Ramesh Bhat, A. Pramesh Rao, & Yashwant Gupta.* 514, 272 (1999)

GUSTAFSON, BO Å. S. Comparison between Multisphere Light-scattering Calculations: Rigorous Solution and Discrete-Dipole Approximation. *Yu-lin Xu & Bo Å. S. Gustafson.* 513, 894 (1999)

GUZZO, L. See DE GRANDI, S., et al. The X-Ray Luminosity Function of Bright Galaxy Clusters in the Local Universe.

See DE GRANDI, S., et al. A Flux-limited Sample of Bright Clusters of Galaxies from the Southern Part of the *ROSAT* All-Sky Survey: The Catalog and log N–log$S$.

HAARDT, FRANCESCO. Radiative Transfer in a Clumpy Universe. III. The Nature of Cosmological Ionizing Sources. *Piero Madau, Francesco Haardt, & Martin J. Rees.* 514, 648 (1999)

HABBAL, SHADIA RIFAI. Extension of the Polar Coronal Hole Boundary into Interplanetary Space. *Richard Woo, Shadia Rifai Habbal, Russell A. Howard, & Clarence M. Korendyke.* 513, 961 (1999)

HABER, DEBORAH. Absorption/Emission of Solar p-Modes: Michelson Doppler Interferometer/*SOHO* Observations. *Deborah Haber, Rekha Jain, & Ellen G. Zweibel.* 515, 832 (1999)

HACHISU, IZUMI. A New Estimation of Mass Accumulation Efficiency in Helium Shell Flashes toward Type Ia Supernova Explosions. *Mariko Kato & Izumi Hachisu.* 513, L41 (1999)

HAIMAN, ZOLTÁN. Constraints from the Hubble Deep Field on High-Redshift Quasar Models. *Zoltán Haiman, Piero Madau, & Abraham Loeb.* 514, 535 (1999)

HAMILTON, ANDREW J. S. *Hubble Space Telescope* Images and Spectra of the Remnant of SN 1885 in M31. *Robert A. Fesen, Christopher L. Gerardy, Kevin M. McLin, & Andrew J. S. Hamilton.* 514, 195 (1999)

HAMMER, FRANCOIS. The Canada-UK Deep Submillimeter Survey: First Submillimeter Images, the Source Counts, and Resolution of the Background. *Stephen Eales, Simon Lilly, Walter Gear, Loretta Dunne,*

J. Richard Bond, Francois Hammer, Olivier Le Fèvre, & David Crampton. 515, 518 (1999)

HAN, MINGSHENG. See SILBERMANN, N. A., et al. The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XIV. The Cepheids in NGC 1365.

See MADORE, BARRY F., et al. The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XV. A Cepheid Distance to the Fornax Cluster and Its Implications.

HANSLMEIER, A. Time Series of Solar Granulation Images. II. Evolution of Individual Granules. *J. Hirzberger, J. A. Bonet, M. Vázquez, & A. Hanslmeier.* 515, 441 (1999)

HARA, H. Microscopic Nonthermal Plasma Notions of Coronal Loops in a Solar Active Region. *H. Hara & K. Ichimoto.* 513, 969 (1999)

HARARI, DIEGO D. Weak Lensing by Large-Scale Structure and the Polarization Properties of Distant Radio Sources. *Gabriela C. Surpi & Diego D. Harari.* 515, 455 (1999)

HARDING, A. K. *Rossi X-Ray Timing Explorer* Observation of PSR B1706−44 and Implications for Theoretical Models of Pulsar Emission. *A. Ray, A. K. Harding, & M. Strickman.* 513, 919 (1999)

HARDING, PAUL. See SILBERMANN, N. A., et al. The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XIV. The Cepheids in NGC 1365.

See MADORE, BARRY F., et al. The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XV. A Cepheid Distance to the Fornax Cluster and Its Implications.

HARDY, EDUARDO. The Stellar Populations of Spiral Disks. II. Measuring and Modeling the Radial Distribution of Absorption Spectral Indices. *Mercedes Mollá, Eduardo Hardy, & Dominique Beauchamp.* 513, 695 (1999)

HARMON, B. A. See VAN DER HOOFT, F., et al. Hard X-Ray Variability of the Black Hole Candidate GRO J0422+32 during Its 1992 Outburst.

See HJELLMING, R. M., et al. Radio and X-Ray Observations of the 1998 Outburst of the Recurrent X-Ray Transient 4U 1630−47.

HARRISON, THOMAS E. *Hubble Space Telescope* Fine Guidance Sensor Astrometric Parallaxes for Three Dwarf Novae: SS Aurigae, SS Cygni, and U Geminorum. *Thomas E. Harrison, Bernard J. McNamara, Paula Szkody, Barbara E. McArthur, G. F. Benedict, Arnold R. Klemola, & Ronald L. Gilliland.* 515, L93 (1999)

HARTMAN, D. H. No Evidence for Gamma-Ray Burst/Abell Cluster or Gamma-Ray Burst/Radio-quiet Quasar Correlations. *K. Hurley, D. H. Hartman, C. Kouveliotou, R. M. Kippen, J. Laros, T. Cline, & M. Boer.* 515, 497 (1999)

HARTMAN, R. C. See KATAOKA, J., et al. High-Energy Emission from the TeV Blazar Markarian 501 during Multiwavelength Observations in 1996.

HARTMANN, DAP. High-Velocity Clouds: Building Blocks of the Local Group. *Leo Blitz, David N. Spergel, Peter J. Teuben, Dap Hartmann, & W. Butler Burton.* 514, 818 (1999)

HARTMANN, DIETER H. A Statistical Treatment of the Gamma-Ray Burst "No Host Galaxy" Problem. II. Energies of Standard Candle Bursts. *David L. Band, Dieter H. Hartmann, & Bradley E. Schaefer.* 514, 862 (1999)

HARVEY, K. L. A Stable Filament Cavity with a Hot Core. *H. S. Hudson, L. W. Acton, K. L. Harvey, & D. E. McKenzie.* 513, L83 (1999)

HARVEY, KAREN L. Magnetic and Radiative Variability of Solar Surface Structures. I. Image Decomposition and Magnetic-Intensity Mapping. *Karen L. Harvey & Oran R. White.* 515, 812 (1999)

HASEGAWA, TETSUO. A High-Velocity Molecular Cloud near the Center of the Galaxy. *Tomoharu Oka, Glenn J. White, Tetsuo Hasegawa, Fumio Sato, Masato Tsuboi, & Atsushi Miyazaki.* 515, 249 (1999)

HAYWARD, T. L. Direct Spectroscopic Evidence for Ionized Polycyclic Aromatic Hydrocarbons in the Interstellar Medium. *G. C. Sloan, T. L. Hayward, L. J. Allamandola, J. D. Bregman, B. DeVito, & D. M. Hudgins.* 513, L65 (1999)

HECKMAN, TIMOTHY M. *ASCA* Observations of the Starburst-driven Superwind Galaxy NGC 2146: Broadband (0.6–9 keV) Spectral Properties. *Roberto Della Ceca, Richard E. Griffiths, Timothy M. Heckman, Matthew D. Lehnert, & Kimberly A. Weaver.* 514, 772 (1999)

On the Structure and Morphology of the "Diffuse Ionized Medium" in Star-forming Galaxies. *Jing Wang, Timothy M. Heckman, & Matthew D. Lehnert.* 515, 97 (1999)

HEISE, J. Bursts from GS 1826−238: A Clocked Thermonuclear Flashes Generator. *P. Ubertini, A. Bazzano, M. Cocchi, L. Natalucci, J. Heise, J. M. Muller, & J. J. M. in 't Zand.* 514, L27 (1999)

See PIRO, L., et al. The X-Ray Afterglow of the Gamma-Ray Burst of 1997 May 8: Spectral Variability and Possible Evidence of an Iron Line.

HENNING, TH. On the Azimuthal Structure of Thermal Convection in Circumstellar Disks. *H. H. Klahr, Th. Henning, & W. Kley.* 514, 325 (1999)

HENRIKSEN, MARK J. *Rossi X-Ray Timing Explorer* Hard X-Ray Observation of Abell 754: Constraining the Hottest Temperature Component and the Intracluster Magnetic Field. *Azita Valinia, Mark J. Henriksen, Michael Lowenstein, Kurt Roettiger, Richard F. Mushotzky, & Greg Madejski.* 515, 42 (1999)

HENRY, G. W. See BODEN, A. F., et al. The Visual Orbit of ι Pegasi.

HERBST, ERIC. New H and H_2 Reactions with Small Hydrocarbon Ions and Their Roles in Benzene Synthesis in Dense Interstellar Clouds. *Murray J. McEwan, Graham B. I. Scott, Nigel G. Adams, Lucia M. Babcock, R. Terzieva, & Eric Herbst.* 513, 287 (1999)

HERNQUIST, LARS. Tidal Shocking by Extended Mass Distributions. *Oleg Y. Gnedin, Lars Hernquist, & Jeremiah P. Ostriker.* 514, 109 (1999)

HESTER, J. JEFF. See PAHRE, MICHAEL A., et al. Detection of Surface Brightness Fluctuations in NGC 4373 Using the *Hubble Space Telescope*.

See KRIST, JOHN E., et al. *Hubble Space Telescope* WFPC2 Imaging of XZ Tauri: Time Evolution of a Herbig-Haro Bow Shock.

HEYER, MARK H. JCMT Observations of Cometary Clouds in the Galactic Chimney near W4. *A. R. Taylor, Judith A. Irwin, Henry E. Matthews, & Mark H. Heyer.* 513, 339 (1999)

HIGDON, JAMES L. The Eastern Arm of M83 Revisited: High-Resolution Mapping of ^{12}CO 1–0 Emission. *Richard J. Rand, Steven D. Lord, & James L. Higdon.* 513, 720 (1999)

HILL, GARY J. Lack of Iron Abundance Evolution in High-Redshift QSOs. *Keith L. Thompson, Gary J. Hill, & Richard Elston.* 515, 487 (1999)

HILL, ROBERT J. See SILBERMANN, N. A., et al. The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XIV. The Cepheids in NGC 1365.

HINES, DEAN C. See SCHNEIDER, GLENN, et al. NICMOS Imaging of the HR 4796A Circumstellar Disk.

The Polarized Spectrum of APM 08279+5255. *Dean C. Hines, Gary D. Schmidt, & Paul S. Smith.* 514, L91 (1999)

HIRAOKA, KENZO. Reaction of H Atoms with Solid C_2H_4 and C_2H_6 at 13 K. *Kenzo Hiraoka, Kazuyosi Yamamoto, Yoshihide Kihara, Toshikazu Takayama, & Tetsuya Sato.* 514, 524 (1999)

HIRZBERGER, J. Time Series of Solar Granulation Images. II. Evolution of Individual Granules. *J. Hirzberger, J. A. Bonet, M. Vázquez, & A. Hanslmeier.* 515, 441 (1999)

HJELLMING, R. M. Radio and X-Ray Observations of the 1998 Outburst of the Recurrent X-Ray Transient 4U 1630−47. *R. M. Hjellming, M. P. Rupen, A. J. Mioduszewski, E. Kuulkers, M. McCollough, B. A. Harmon, M. Buxton, R. Sood, A. Tzioumis, D. Rayner, S. Dieters, & P. Durouchoux.* 514, 383 (1999)

HO, PAUL T. P. Infalling Gas toward the Galactic Center. *Alison L. Coil & Paul T. P. Ho.* 513, 752 (1999)

Disk and Outflow in Cepheus A–HW2: Interferometric SiO and HCO^+ Observations. *José F. Gómez, Anneila I. Sargent, José M. Torrelles, Paul T. P. Ho, Luis F. Rodríguez, Jorge Cantó, & Guido Garay.* 514, 287 (1999)

HODGE, PAUL W. See GALLART, CARME, et al. *Hubble Space Telescope* Observations of the Local Group Dwarf Galaxy Leo I.

HOESSEL, JOHN G. See KELSON, DANIEL D., et al. The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XIX. The Discovery of Cepheids in and a New Distance to NGC 3198.

See SILBERMANN, N. A., et al. The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XIV. The Cepheids in NGC 1365.

See MADORE, BARRY F., et al. The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XV. A Cepheid Distance to the Fornax Cluster and Its Implications.

See PAHRE, MICHAEL A., et al. Detection of Surface Brightness Fluctuations in NGC 4373 Using the *Hubble Space Telescope*.

See KRIST, JOHN E., et al. *Hubble Space Telescope* WFPC2 Imaging of XZ Tauri: Time Evolution of a Herbig-Haro Bow Shock.

HOFMEISTER, A. M. The SiC Problem: Astronomical and Meteoritic Evidence. *A. K. Speck, A. M. Hofmeister, & M. J. Barlow.* 513, L87 (1999)

HOFNER, PETER. Ultracompact H II Regions with Extended Radio-Continuum Emission. *Stanley E. Kurtz, Alan M. Watson, Peter Hofner, & Birgit Otte.* 514, 232 (1999)

Ammonia Absorption toward the Ultracompact H II Regions G45.12+0.13 and G45.47+0.05. *Peter Hofner, Sarah Peterson, & Riccardo Cesaroni.* 514, 899 (1999)

HOGERHEIJDE, MICHIEL R. Envelope Structure of Deeply Embedded Young Stellar Objects in the Serpens Molecular Cloud. *Michiel R. Hogerheijde, Ewine F. van Dishoeck, Jante M. Salverda, & Geoffrey A. Blake.* 513, 350 (1999)

Far-Infrared and Submillimeter Observations and Physical Models of the Reflection Nebula Cederblad 201. *Ciska Kemper, Marco Spaans, David J. Jansen, Michiel R. Hogerheijde, Ewine F. van Dishoeck, & Alexander G. G. M. Tielens.* 515, 649 (1999)

HOGG, DAVID W. A Possible Gravitational Lens in the Hubble Deep Field South. *Rennan Barkana, Roger Blandford, & David W. Hogg.* 513, L91 (1999)

HOLLENBACH, D. Photodissociation Region Models of Photoevaporating Circumstellar Disks and Application to the Proplyds in Orion. *H. Störzer & D. Hollenbach.* 515, 669 (1999)

HOLLIS, J. M. The R Aquarii Jet in Hindsight. *J. M. Hollis, R. Bertram, R. M. Wagner, & C. O. Lampland.* 514, 895 (1999)

HOLTZMAN, JON A. See PAHRE, MICHAEL A., et al. Detection of Surface Brightness Fluctuations in NGC 4373 Using the *Hubble Space Telescope*.

See KRIST, JOHN E., et al. *Hubble Space Telescope* WFPC2 Imaging of XZ Tauri: Time Evolution of a Herbig-Haro Bow Shock.

HOLZAPFEL, WILLIAM L. Interferometric Observation of Cosmic Microwave Background Anisotropies. *Martin White, John E. Carlstrom, Mark Dragovan, & William L. Holzapfel.* 514, 12 (1999)

HOMAN, JEROEN. Discovery of Twin Kilohertz Quasi-periodic Oscillations in the High Galactic Latitude X-Ray Transient XTE J2123−058. *Jeroen Homan, Mariano Mendez, Rudy Wijnands, Michiel van der Klis, & Jan van Paradijs.* 513, L119 (1999)

HONG, B. H. Is Coherence Essential to Account for Pulsar Radio Emission? *Bing Zhang, B. H. Hong, & G. J. Qiao.* 514, L111 (1999)

HONG, SEUNG SOO. A Multidimensional Code for Isothermal Magnetohydrodynamic Flows in Astrophysics. *Jongsoo Kim, Dongsu Ryu, T. W. Jones, & Seung Soo Hong.* 514, 506 (1999)

HOOPER, ERIC. *ASCA* and Contemporaneous Ground-based Observations of the BL Lacertae Objects 1749+096 and 2200+420 (BL Lac). *Rita M. Sambruna, Gabriele Ghisellini, Eric Hooper, R. I. Kollgaard, Joseph E. Pesce, & C. Megan Urry.* 515, 140 (1999)

HOWARD, RUSSELL A. Extension of the Polar Coronal Hole Boundary into Interplanetary Space. *Richard Woo, Shadia Rifai Habbal, Russell A. Howard, & Clarence M. Korendyke.* 513, 961 (1999)

HRIVNAK, BRUCE J. Subarcsecond Optical Imaging of Proto–Planetary Nebulae. *Bruce J. Hrivnak, Philip P. Langill, Kate Y. L. Su, & Sun Kwok.* 513, 421 (1999)

Discovery of Two New, Carbon-rich Proto–Planetary Nebulae: IRAS Z02229+6208 and IRAS 07430+1115. *Bruce J. Hrivnak & Sun Kwok.* 513, 869 (1999)

HU, WAYNE. Weak Lensing: Prospects for Measuring Cosmological Parameters. *Wayne Hu & Max Tegmark.* 514, L65 (1999)

HUANG, J. H. New Wolf-Rayet Galaxies with Detection of WC Stars. *J. H. Huang, Q. S. Gu, L. Ji, W. D. Li, J. Y. Wei, & W. Zheng.* 513, 215 (1999)

HUCHRA, JOHN. See SILBERMANN, N. A., et al. The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XIV. The Cepheids in NGC 1365.

See MADORE, BARRY F., et al. The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XV. A Cepheid Distance to the Fornax Cluster and Its Implications.

HUCHRA, JOHN P. See KELSON, DANIEL D., et al. The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XIX. The Discovery of Cepheids in and a New Distance to NGC 3198.

HUDGINS, D. M. Direct Spectroscopic Evidence for Ionized Polycyclic Aromatic Hydrocarbons in the Interstellar Medium. *G. C. Sloan, T. L. Hayward, L. J. Allamandola, J. D. Bregman, B. DeVito, & D. M. Hudgins.* 513, L65 (1999)

HUDGINS, DOUGLAS M. The Spacing of the Interstellar 6.2 and 7.7 Micron Emission Features as an Indicator of Polycyclic Aromatic Hydrocarbon Size. *Douglas M. Hudgins & L. J. Allamandola.* 513, L69 (1999)

HUDSON, H. S. A Stable Filament Cavity with a Hot Core. *H. S. Hudson, L. W. Acton, K. L. Harvey, & D. E. McKenzie.* 513, L83 (1999)

HUGHES, SHAUN M. See MADORE, BARRY F., et al. The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XV. A Cepheid Distance to the Fornax Cluster and Its Implications.

HUGHES, SHAUN M. G. See KELSON, DANIEL D., et al. The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XIX. The Discovery of Cepheids in and a New Distance to NGC 3198.

See SILBERMANN, N. A., et al. The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XIV. The Cepheids in NGC 1365.

HUNTER, JAMES H., JR. Satellites as Probes of the Masses of Spiral Galaxies. *Lance K. Erickson, S. T. Gottesman, & James H. Hunter, Jr.* 515, 153 (1999)

HURLEY, K. No Evidence for Gamma-Ray Burst/Abell Cluster or Gamma-Ray Burst/Radio-quiet Quasar Correlations. *K. Hurley, D. H. Hartman, C. Kouveliotou, R. M. Kippen, J. Laros, T. Cline, & M. Boer.* 515, 497 (1999)

HURT, TODD. Ultraviolet Imaging Polarimetry of Narrow-Line Radio Galaxies. *Todd Hurt, Robert Antonucci, Ross Cohen, Anne Kinney, & Julian Krolik.* 514, 579 (1999)

HUTERER, DRAGAN. Gravitational Lensing as a Probe of Quintessence. *Asantha R. Cooray & Dragan Huterer.* 513, L95 (1999)

HYUNG, SIEK. Spectroscopic Observations of the Planetary Nebula NGC 6818. *Siek Hyung, Lawrence H. Aller, & Walter A. Feibelman.* 514, 878 (1999)

IBEN, ICKO, JR. On the Evolution of Stars that Form Electron-degenerate Cores Processed by Carbon Burning. V. Shell Convection Sustained by Helium Burning, Transient Neon Burning, Dredge-out, Urca Cooling, and Other Properties of an 11 $M_{\odot}$ Population I Model Star. *Claudio Ritossa, Enrique García-Berro, & Icko Iben, Jr.* 515, 381 (1999)

ICHIMOTO, K. Microscopic Nonthermal Plasma Notions of Coronal Loops in a Solar Active Region. *H. Hara & K. Ichimoto.* 513, 969 (1999)

IKEUCHI, SATORU. Formation of Quasar Nuclei in the Hearts of Ultraluminous Infrared Galaxies. *Yoshiaki Taniguchi, Satoru Ikeuchi, & Yasuhiro Shioya.* 514, L9 (1999)

ILLINGWORTH, GARTH D. See KELSON, DANIEL D., et al. The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XIX. The Discovery of Cepheids in and a New Distance to NGC 3198.

See SILBERMANN, N. A., et al. The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XIV. The Cepheids in NGC 1365.

See MADORE, BARRY F., et al. The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XV. A Cepheid Distance to the Fornax Cluster and Its Implications.

IMAMURA, JAMES N. V2301 Ophiuchi: An X-Ray–bright Eclipsing AM Herculis Object. *Thomas Y. Steiman-Cameron & James N. Imamura.* 515, 404 (1999)

INGALLS, JAMES G. A Semianalytical Model for the Observational Properties of the Dominant Carbon Species at Different Metallicities. *Alberto D. Bolatto, James M. Jackson, & James G. Ingalls.* 513, 275 (1999)

INOUE, S. See KATAOKA, J., et al. High-Energy Emission from the TeV Blazar Markarian 501 during Multiwavelength Observations in 1996.

IN 'T ZAND, J. See PIRO, L., et al. The X-Ray Afterglow of the Gamma-Ray Burst of 1997 May 8: Spectral Variability and Possible Evidence of an Iron Line.

IN 'T ZAND, J. J. M. Bursts from GS 1826−238: A Clocked Thermonuclear Flashes Generator. *P. Ubertini, A. Bazzano, M. Cocchi, L. Natalucci, J. Heise, J. M. Muller, & J. J. M. in 't Zand.* 514, L27 (1999)

IRWIN, JUDITH A. JCMT Observations of Cometary Clouds in the Galactic Chimney near W4. *A. R. Taylor, Judith A. Irwin, Henry E. Matthews, & Mark H. Heyer.* 513, 339 (1999)

IVISON, R. J. See FRAYER, D. T., et al. Molecular Gas in the $z = 2.565$ Submillimeter Galaxy SMM J14011+0252.

JACKSON, JAMES M. A Semianalytical Model for the Observational Properties of the Dominant Carbon Species at Different Metallicities. *Alberto D. Bolatto, James M. Jackson, & James G. Ingalls.* 513, 275 (1999)

JACOBY, GEORGE H. Chemical Abundances of Planetary Nebulae in the Bulge and Disk of M31. *George H. Jacoby & Robin Ciardullo.* 515, 169 (1999)

The Circumstellar Extinction of Planetary Nebulae. *Robin Ciardullo & George H. Jacoby.* 515, 191 (1999)

JAFFE, A. H. Streaming Velocities as a Dynamical Estimator of Ω. *P. G. Ferreira, R. Juszkiewicz, H. A. Feldman, M. Davis, & A. H. Jaffe.* 515, L1 (1999)

JAIN, REKHA. Absorption/Emission of Solar p-Modes: Michelson Doppler Interferometer/*SOHO* Observations. *Deborah Haber, Rekha Jain, & Ellen G. Zweibel.* 515, 832 (1999)

JANSEN, DAVID J. Far-Infrared and Submillimeter Observations and Physical Models of the Reflection Nebula Cederblad 201. *Ciska Kemper, Marco*

Spaans, David J. Jansen, Michiel R. Hogerheijde, Ewine F. van Dishoeck, & Alexander G. G. M. Tielens. 515, 649 (1999)

JI, L. New Wolf-Rayet Galaxies with Detection of WC Stars. *J. H. Huang, Q. S. Gu, L. Ji, W. D. Li, J. Y. Wei, & W. Zheng.* 513, 215 (1999)

JIMENEZ, ANTONIO. See CHOU, DEAN-YI, et al. Acoustic Imaging in Helioseismology.

JIMENEZ, RAUL. On the Origin of Damped Lyα Systems: A Case for Low Surface Brightness Galaxies? *Raul Jimenez, David V. Bowen, & Francesca Matteucci.* 514, L83 (1999)

JING, Y. P. Accurate Determination of the Lagrangian Bias for the Dark Matter Halos. *Y. P. Jing.* 515, L45 (1999)

JOHNSTON, SIMON. Origin of the Transient, Unpulsed Radio Emission from the PSR B1259−63 Binary System. *Lewis Ball, Andrew Melatos, Simon Johnston, & Olaf Skjæraasen.* 514, L39 (1999)

The "Rabbit": A Potential Radio Counterpart of GeV J1417−6100. *Mallory S. E. Roberts, Roger W. Romani, Simon Johnston, & Anne J. Green.* 515, 712 (1999)

JOHNSTONE, DOUG. See WILSON, CHRISTINE D., et al. Submillimeter Continuum Emission in the ρ Ophiuchi Molecular Cloud: Filaments, Arcs, and an Unidentified Far-Infrared Object.

JONCAS, GILLES. See WILSON, CHRISTINE D., et al. Submillimeter Continuum Emission in the ρ Ophiuchi Molecular Cloud: Filaments, Arcs, and an Unidentified Far-Infrared Object.

JONES, C. A Hot Spot in Coma. *R. Hank Donnelly, M. Markevitch, W. Forman, C. Jones, E. Churazov, & M. Gilfanov.* 513, 690 (1999)

Stellar Metallicities and Type Ia Supernova Rates in the Early-Type Galaxy NGC 5846 from *ROSAT* and *ASCA* Observations. *A. Finoguenov, C. Jones, W. Forman, & L. David.* 514, 844 (1999)

JONES, T. W. A Multidimensional Code for Isothermal Magnetohydrodynamic Flows in Astrophysics. *Jongsoo Kim, Dongsu Ryu, T. W. Jones, & Seung Soo Hong.* 514, 506 (1999)

JOSHI, B. C. Competing Drifting Radio Subpulses in PSR B0031−07. *M. Vivekanand & B. C. Joshi.* 515, 398 (1999)

JOYCE, M. Fractal Correlations in the CfA2–South Redshift Survey. *M. Joyce, M. Montuori, & F. Sylos Labini.* 514, L5 (1999)

JURA, M. Dust around First-Ascent Red Giants. *M. Jura.* 515, 706 (1999)

JUSZKIEWICZ, R. Streaming Velocities as a Dynamical Estimator of Ω. *P. G. Ferreira, R. Juszkiewicz, H. A. Feldman, M. Davis, & A. H. Jaffe.* 515, L1 (1999)

KAARET, PHILIP. Discovery of Microsecond Soft Lags in the X-Ray Emission of the Atoll Source 4U 1636−536. *Philip Kaaret, Santina Piraino, Eric C. Ford, & Andrea Santangelo.* 514, L31 (1999)

KAISER, M. E. See SAVAGLIO, S., et al. The Lyα Forest of the Quasar in the Hubble Deep Field South.

KAMAYA, HIDEYUKI. Mass Condensation on Proto–Globular Clusters of the Two-Component Protogalaxy. *Hideyuki Kamaya.* 514, L21 (1999)

KAMIONKOWSKI, MARC. Weakly Nonlinear Clustering for Arbitrary Expansion Histories. *Marc Kamionkowski & Ari Buchalter.* 514, 7 (1999)

KARTJE, JOHN F. Megamaser Disks in Active Galactic Nuclei. *John F. Kartje, Arieh Königl, & Moshe Elitzur.* 513, 180 (1999)

KASSIM, NAMIR E. G359.87+0.18, An FR II Radio Galaxy 15′ from Sagittarius A*: Implications for the Scattering Region in the Galactic Center. *T. Joseph W. Lazio, K. R. Anantharamaiah, W. M. Goss, Namir E. Kassim, & James M. Cordes.* 515, 196 (1999)

KATAOKA, J. High-Energy Emission from the TeV Blazar Markarian 501 during Multiwavelength Observations in 1996. *J. Kataoka, J. R. Mattox, J. Quinn, H. Kubo, F. Makino, T. Takahashi, S. Inoue, R. C. Hartman, G. M. Madejski, P. Sreekumar, & S. J. Wagner.* 514, 138 (1999)

KATES, R. Self-regulating Galaxy Formation as an Explanation for the Tully-Fisher Relation. *D. Elizondo, G. Yepes, R. Kates, V. Müller, & A. Klypin.* 515, 525 (1999)

KATO, MARIKO. A New Estimation of Mass Accumulation Efficiency in Helium Shell Flashes toward Type Ia Supernova Explosions. *Mariko Kato & Izumi Hachisu.* 513, L41 (1999)

KAZÈS, ILYA. Detection of the CN Zeeman Effect in Molecular Clouds. *Richard M. Crutcher, Thomas H. Troland, Bernard Lazareff, Gebriel Paubert, & Ilya Kazès.* 514, L121 (1999)

KELLERMANN, K. I. CTD 93 and the Nature of Gigahertz-peaked Spectrum Radio Sources. *David B. Shaffer, K. I. Kellermann, & T. J. Cornwell.* 515, 558 (1999)

KELSON, DAN. See SILBERMANN, N. A., et al. The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XIV. The Cepheids in NGC 1365.

KELSON, DANIEL D. The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XIX. The Discovery of Cepheids in and a New Distance to NGC 3198. *Daniel D. Kelson, Garth D. Illingworth, Abhijit Saha, John A. Graham, Peter B. Stetson, Wendy L. Freedman, Robert C. Kennicutt, Jeremy R. Mould, Laura Ferrarese, John P. Huchra, Barry F. Madore, Charles F. Prosser, Fabio Bresolin, Holland C. Ford, Brad K. Gibson, John G. Hoessel, Shaun M. G. Hughes, Lucas M. Macri, Shoko Sakai, & N. A. Silbermann.* 514, 614 (1999)

KEMPER, CISKA. Far-Infrared and Submillimeter Observations and Physical Models of the Reflection Nebula Cederblad 201. *Ciska Kemper, Marco Spaans, David J. Jansen, Michiel R. Hogerheijde, Ewine F. van Dishoeck, & Alexander G. G. M. Tielens.* 515, 649 (1999)

KENNICUTT, ROBERT C, JR. See SILBERMANN, N. A., et al. The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XIV. The Cepheids in NGC 1365.

KENNICUTT, ROBERT C. See KELSON, DANIEL D., et al. The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XIX. The Discovery of Cepheids in and a New Distance to NGC 3198.

KENNICUTT, ROBERT C., JR. On Measuring Nebular Chemical Abundances in Distant Galaxies Using Global Emission-Line Spectra. *Henry A. Kobulnicky, Robert C. Kennicutt, Jr., & James L. Pizagno.* 514, 544 (1999)

KERSCHER, MARTIN. A Global Descriptor of Spatial Pattern Interaction in the Galaxy Distribution. *Martin Kerscher, María Jesús Pons-Bordería, Jens Schmalzing, Roberto Trasarti-Battistoni, Thomas Buchert, Vicent J. Martínez, & Riccardo Valdarnini.* 513, 543 (1999)

KESSLER, MARTIN F. *Infrared Space Observatory*–Long Wavelength Spectrometer Detection of the 112 Micron HD $J = 1 \rightarrow 0$ Line toward the Orion Bar. *Christopher M. Wright, Ewine F. van Dishoeck, Pierre Cox, Sunil D. Sidher, & Martin F. Kessler.* 515, L29 (1999)

KHALIKOV, SHUKUR. See CHOU, DEAN-YI, et al. Acoustic Imaging in Helioseismology.

KIHARA, YOSHIHIDE. Reaction of H Atoms with Solid C_2H_4 and C_2H_6 at 13 K. *Kenzo Hiraoka, Kazuyosi Yamamoto, Yoshihide Kihara, Toshikazu Takayama, & Tetsuya Sato.* 514, 524 (1999)

KIM, JONGSOO. A Multidimensional Code for Isothermal Magnetohydrodynamic Flows in Astrophysics. *Jongsoo Kim, Dongsu Ryu, T. W. Jones, & Seung Soo Hong.* 514, 506 (1999)

The Collisions of High-Velocity Clouds with a Magnetized Gaseous Galactic Disk. *Alfredo Santillán, José Franco, Marco Martos, & Jongsoo Kim.* 515, 657 (1999)

KINNEY, ANNE. Ultraviolet Imaging Polarimetry of Narrow-Line Radio Galaxies. *Todd Hurt, Robert Antonucci, Ross Cohen, Anne Kinney, & Julian Krolik.* 514, 579 (1999)

KINZER, R. L. Gamma-Ray Emission from the Inner Galactic Ridge. *R. L. Kinzer, W. R. Purcell, & J. D. Kurfess.* 515, 215 (1999)

KIPPEN, R. M. No Evidence for Gamma-Ray Burst/Abell Cluster or Gamma-Ray Burst/Radio-quiet Quasar Correlations. *K. Hurley, D. H. Hartman, C. Kouveliotou, R. M. Kippen, J. Laros, T. Cline, & M. Boer.* 515, 497 (1999)

KLAHR, H. H. On the Azimuthal Structure of Thermal Convection in Circumstellar Disks. *H. H. Klahr, Th. Henning, & W. Kley.* 514, 325 (1999)

KLEMOLA, ARNOLD R. *Hubble Space Telescope* Fine Guidance Sensor Astrometric Parallaxes for Three Dwarf Novae: SS Aurigae, SS Cygni, and U Geminorum. *Thomas E. Harrison, Bernard J. McNamara, Paula Szkody, Barbara E. McArthur, G. F. Benedict, Arnold R. Klemola, & Ronald L. Gilliland.* 515, L93 (1999)

KLEY, W. On the Azimuthal Structure of Thermal Convection in Circumstellar Disks. *H. H. Klahr, Th. Henning, & W. Kley.* 514, 325 (1999)

KLIMCHUK, J. A. Three-dimensional Stereoscopic Analysis of Solar Active Region Loops. I. *SOHO*/EIT Observations at Temperatures of (1.0–1.5) $\times 10^6$ K. *Markus J. Aschwanden, Jeffrey S. Newmark, Jean-Pierre Delaboudinière, Werner M. Neupert, J. A. Klimchuk, G. Allen Gary, Fabrice Portier-Fozzani, & Arik Zucker.* 515, 842 (1999)

KLYPIN, A. Self-regulating Galaxy Formation as an Explanation for the Tully-Fisher Relation. *D. Elizondo, G. Yepes, R. Kates, V. Müller, & A. Klypin.* 515, 525 (1999)

KNEE, LEWIS B. G. See WILSON, CHRISTINE D., et al. Submillimeter Continuum Emission in the ρ Ophiuchi Molecular Cloud: Filaments, Arcs, and an Unidentified Far-Infrared Object.

KNEIB, J.-P. See FRAYER, D. T., et al. Molecular Gas in the $z = 2.565$ Submillimeter Galaxy SMM J14011+0252.

KNEZEK, PATRICIA M. Evolutionary Status of Dwarf "Transition" Galaxies. *Patricia M. Knezek, Kenneth R. Sembach, & John S. Gallagher III.* 514, 119 (1999)

KOBAYASHI, SHIHO. Hydrodynamics of a Relativistic Fireball: The Complete Evolution. *Shiho Kobayashi, Tsvi Piran, & Re'em Sari.* 513, 669 (1999)

KOBULNICKY, HENRY A. On Measuring Nebular Chemical Abundances in Distant Galaxies Using Global Emission-Line Spectra. *Henry A. Kobulnicky, Robert C. Kennicutt, Jr., & James L. Pizagno.* 514, 544 (1999)

KÖNIGL, ARIEH. Megamaser Disks in Active Galactic Nuclei. *John F. Kartje, Arieh Königl, & Moshe Elitzur.* 513, 180 (1999)

KOERNER, DAVID W. See SCHNEIDER, GLENN, et al. NICMOS Imaging of the HR 4796A Circumstellar Disk.

KOLLGAARD, R. I. *ASCA* and Contemporaneous Ground-based Observations of the BL Lacertae Objects 1749+096 and 2200+420 (BL Lac). *Rita M. Sambruna, Gabriele Ghisellini, Eric Hooper, R. I. Kollgaard, Joseph E. Pesce, & C. Megan Urry.* 515, 140 (1999)

KOLLGAARD, RONALD I. Determining the Fraction of Intrinsic C IV Absorption in Quasi-stellar Object Absorption-Line Systems. *Gordon T. Richards, Donald G. York, Brian Yanny, Ronald I. Kollgaard, S. A. Laurent-Muehleisen, & Daniel E. Vanden Berk.* 513, 576 (1999)

KONACKI, MACIEJ. Resonance in PSR B1257+12 Planetary System. *Maciej Konacki, Andrzej J. Maciejewski, & Alex Wolszczan.* 513, 471 (1999)

KOPEIKIN, S. M. Frame Dragging and Other Precessional Effects in Black Hole Pulsar Binaries. *N. Wex & S. M. Kopeikin.* 514, 388 (1999)

KORENDYKE, CLARENCE M. Extension of the Polar Coronal Hole Boundary into Interplanetary Space. *Richard Woo, Shadia Rifai Habbal, Russell A. Howard, & Clarence M. Korendyke.* 513, 961 (1999)

KORESKO, C. D. See BODEN, A. F., et al. The Visual Orbit of ι Pegasi.

KORPI, M. J. A Supernova-regulated Interstellar Medium: Simulations of the Turbulent Multiphase Medium. *M. J. Korpi, A. Brandenburg, A. Shukurov, I. Tuominen, & Å Nordlund.* 514, L99 (1999)

KOSOVICHEV, A. G. Source of Solar Acoustic Modes. *R. Nigam & A. G. Kosovichev.* 514, L53 (1999)

KOUVELIOTOU, C. See VAN DER HOOFT, F., et al. Hard X-Ray Variability of the Black Hole Candidate GRO J0422+32 during Its 1992 Outburst.

No Evidence for Gamma-Ray Burst/Abell Cluster or Gamma-Ray Burst/Radio-quiet Quasar Correlations. *K. Hurley, D. H. Hartman, C. Kouveliotou, R. M. Kippen, J. Laros, T. Cline, & M. Boer.* 515, 497 (1999)

KRAUSS, LAWRENCE M. Gravitational Lensing and Dark Structures. *Yu-Chung N. Cheng & Lawrence M. Krauss.* 514, 25 (1999)

KRICHBAUM, THOMAS P. See FALCKE, HEINO, et al. A Major Radio Outburst in III Zw 2 with an Extremely Inverted, Millimeter-peaked Spectrum.

KRIST, JOHN E. *Hubble Space Telescope* WFPC2 Imaging of XZ Tauri: Time Evolution of a Herbig-Haro Bow Shock. *John E. Krist, Karl R. Stapelfeldt, Christopher J. Burrows, J. Jeff Hester, Alan M. Watson, Gilda E. Ballester, John T. Clarke, David Crisp, Robin W. Evans, John S. Gallegher III, Richard E. Griffiths, John G. Hoessel, Jon A. Holtzman, Jeremy R. Mould, Paul A. Scowen, & John T. Trauger.* 515, L35 (1999)

KROLIK, J. H. Magnetized Accretion inside the Marginally Stable Orbit around a Black Hole. *J. H. Krolik.* 515, L73 (1999)

KROLIK, JULIAN. Ultraviolet Imaging Polarimetry of Narrow-Line Radio Galaxies. *Todd Hurt, Robert Antonucci, Ross Cohen, Anne Kinney, & Julian Krolik.* 514, 579 (1999)

KRONGOLD, Y. The Close Environment of Seyfert Galaxies and Its Implication for Unification Models. *D. Dultzin-Hacyan, Y. Krongold, I. Fuentes-Guridi, & P. Marziani.* 513, L111 (1999)

KUBO, H. See KATAOKA, J., et al. High-Energy Emission from the TeV Blazar Markarian 501 during Multiwavelength Observations in 1996.

KUDOH, TAKAHIRO. Alfvén Wave Model of Spicules and Coronal Heating. *Takahiro Kudoh & Kazunari Shibata.* 514, 493 (1999)

KULKARNI, S. R. See BODEN, A. F., et al. The Visual Orbit of ι Pegasi.

KUNDU, ARUNAV. The Globular Cluster System in the Inner Region of M87. *Arunav Kundu, Bradley C. Whitmore, William B. Sparks, F. Duccio Macchetto, Stephen E. Zepf, & Keith M. Ashman.* 513, 733 (1999)

KUNDU, M. R. A Study of Microwave-selected Coronal Transient Brightenings. *A. Nindos, M. R. Kundu, & S. M. White.* 513, 983 (1999)

KURASZKIEWICZ, JOANNA. Investigation of the Relation between the Spectral Energy Distributions and the Emission Lines in Low-Redshift Quasars. *Belinda J. Wilkes, Joanna Kuraszkiewicz, Paul J. Green, Smita Mathur, & Jonathan C. McDowell.* 513, 76 (1999)

KURFESS, J. D. Gamma-Ray Emission from the Inner Galactic Ridge. *R. L. Kinzer, W. R. Purcell, & J. D. Kurfess.* 515, 215 (1999)

KURTZ, STANLEY E. Ultracompact H II Regions with Extended Radio-Continuum Emission. *Stanley E. Kurtz, Alan M. Watson, Peter Hofner, & Birgit Otte.* 514, 232 (1999)

KUULKERS, E. See HJELLMING, R. M., et al. Radio and X-Ray Observations of the 1998 Outburst of the Recurrent X-Ray Transient 4U 1630−47.

KUZNETSOV, O. A. Hydrodynamic Simulations of Counterrotating Accretion Disks. *O. A. Kuznetsov, R. V. E. Lovelace, M. M. Romanova, & V. M. Chechetkin.* 514, 691 (1999)

KWOK, SUN. Subarcsecond Optical Imaging of Proto–Planetary Nebulae. *Bruce J. Hrivnak, Philip P. Langill, Kate Y. L. Su, & Sun Kwok.* 513, 421 (1999)

Discovery of Two New, Carbon-rich Proto–Planetary Nebulae: IRAS Z02229+6208 and IRAS 07430+1115. *Bruce J. Hrivnak & Sun Kwok.* 513, 869 (1999)

KWON, K. H. Smoothed Particle Hydrodynamic Simulations of Galactic Gaseous Disk with Bar: Distribution and Kinematic Structure of Molecular Clouds toward the Galactic Center. *C. W. Lee, H. M. Lee, H. B. Ann, & K. H. Kwon.* 513, 242 (1999)

LABONTE, BARRY. See CHOU, DEAN-YI, et al. Acoustic Imaging in Helioseismology.

LACEY, CEDRIC. How Dark Matter Halos Cluster in Lagrangian Space. *Cristiano Porciani, Paolo Catelan, & Cedric Lacey.* 513, L99 (1999)

LADA, CHARLES J. Correlation between Gas and Dust in Molecular Clouds. *João Alves, Charles J. Lada, & Elizabeth A. Lada.* 515, 265 (1999)

LADA, ELIZABETH A. Correlation between Gas and Dust in Molecular Clouds. *João Alves, Charles J. Lada, & Elizabeth A. Lada.* 515, 265 (1999)

LAKE, GEORGE. Substructure in Dark Halos: Orbital Eccentricities and Dynamical Friction. *Frank C. van den Bosch, Geraint F. Lewis, George Lake, & Joachim Stadel.* 515, 50 (1999)

LAMBAS, DIEGO G. Quasar-Galaxy and AGN-Galaxy Cross-Correlations. *Héctor J. Martínez, Manuel E. Merchán, Carlos A. Valotto, & Diego G. Lambas.* 514, 558 (1999)

LAMPLAND, C. O. The R Aquarii Jet in Hindsight. *J. M. Hollis, R. Bertram, R. M. Wagner, & C. O. Lampland.* 514, 895 (1999)

LANDECKER, T. L. Radio Polarimetric Imaging of the Interstellar Medium: Magnetic Field and Diffuse Ionized Gas Structure near the W3/W4/W5/HB 3 Complex. *A. D. Gray, T. L. Landecker, P. E. Dewdney, A. R. Taylor, A. G. Willis, & M. Normandeau.* 514, 221 (1999)

LANE, B. F. See BODEN, A. F., et al. The Visual Orbit of ι Pegasi.

LANGILL, PHILIP P. Subarcsecond Optical Imaging of Proto–Planetary Nebulae. *Bruce J. Hrivnak, Philip P. Langill, Kate Y. L. Su, & Sun Kwok.* 513, 421 (1999)

LANZETTA, KENNETH M. A New Catalog of Photometric Redshifts in the Hubble Deep Field. *Alberto Fernández-Soto, Kenneth M. Lanzetta, & Amos Yahil.* 513, 34 (1999)

LAOR, A. The PG X-Ray QSO Sample: Links between the Ultraviolet–X-Ray Continuum and Emission Lines. *Beverley J. Wills, A. Laor, M. S. Brotherton, D. Wills, B. J. Wilkes, G. J. Ferland, & Zhaohui Shang.* 515, L53 (1999)

LARA, L. The Radio-Optical Jet in NGC 3862 from Parsec to Subkiloparsec Scales. *L. Lara, L. Feretti, G. Giovannini, S. Baum, W. D. Cotton, C. P. O'Dea, & T. Venturi.* 513, 197 (1999)

LAROS, J. No Evidence for Gamma-Ray Burst/Abell Cluster or Gamma-Ray Burst/Radio-quiet Quasar Correlations. *K. Hurley, D. H. Hartman, C. Kouveliotou, R. M. Kippen, J. Laros, T. Cline, & M. Boer.* 515, 497 (1999)

LASENBY, ANTHONY. Cosmic Microwave Background Anisotropies in the Cold Dark Matter Model: A Covariant and Gauge-invariant Approach. *Anthony Challinor & Anthony Lasenby.* 513, 1 (1999)

LASOTA, JEAN-PIERRE. A Population of Faint Nontransient Low-Mass Black Hole Binaries. *Kristen Menou, Ramesh Narayan, & Jean-Pierre Lasota.* 513, 811 (1999)

LATTIMER, J. M. Evolution of Proto–Neutron Stars. *J. A. Pons, S. Reddy, M. Prakash, J. M. Lattimer, & J. A. Miralles.* 513, 780 (1999)

LAURENT-MUEHLEISEN, S. A. Determining the Fraction of Intrinsic C IV Absorption in Quasi-stellar Object Absorption-Line Systems. *Gordon T.*

Richards, Donald G. York, Brian Yanny, Ronald I. Kollgaard, S. A. Laurent-Muehleisen, & Daniel E. Vanden Berk. 513, 576 (1999)

Discovery of a Radio-loud/Radio-quiet Binary Quasar. *M. S. Brotherton, Michael D. Gregg, R. H. Becker, S. A. Laurent-Muehleisen, R. L. White, & S. A. Stanford.* 514, L61 (1999)

LAWRENCE, J. K. Characteristic Scales of Photospheric Flows and Their Magnetic and Temperature Markers. *J. K. Lawrence, A. C. Cadavid, & A. A. Ruzmaikin.* 513, 506 (1999)

LAWSON, WARRICK A. First Observations of an R Coronae Borealis Star with the Space Telescope Imaging Spectrograph: RY Sagittarii near Maximum Light. *Geoffrey C. Clayton, T. R. Ayres, Warrick A. Lawson, John S. Drilling, P. Woitke, & Martin Asplund.* 515, 351 (1999)

LAZAREFF, BERNARD. Detection of the CN Zeeman Effect in Molecular Clouds. *Richard M. Crutcher, Thomas H. Troland, Bernard Lazareff, Gebriel Paubert, & Ilya Kazès.* 514, L121 (1999)

LAZIO, T. JOSEPH W. G359.87+0.18, An FR II Radio Galaxy 15′ from Sagittarius A*: Implications for the Scattering Region in the Galactic Center. *T. Joseph W. Lazio, K. R. Anantharamaiah, W. M. Goss, Namir E. Kassim, & James M. Cordes.* 515, 196 (1999)

LECKRONE, DAVID S. Theoretical Oscillator Strengths and Hyperfine Structure in Hg II. *Tomas Brage, Charles Proffitt, & David S. Leckrone.* 513, 524 (1999)

LEE, C. W. Smoothed Particle Hydrodynamic Simulations of Galactic Gaseous Disk with Bar: Distribution and Kinematic Structure of Molecular Clouds toward the Galactic Center. *C. W. Lee, H. M. Lee, H. B. Ann, & K. H. Kwon.* 513, 242 (1999)

LEE, H. M. Smoothed Particle Hydrodynamic Simulations of Galactic Gaseous Disk with Bar: Distribution and Kinematic Structure of Molecular Clouds toward the Galactic Center. *C. W. Lee, H. M. Lee, H. B. Ann, & K. H. Kwon.* 513, 242 (1999)

LEE, HEE-WON. Toward the Evidence of the Accretion Disk Emission in the Symbiotic Star RR Telescopii. *Hee-Won Lee & Myeong-Gu Park.* 515, L89 (1999)

LEE, MYUNG G. See GALLART, CARME, et al. *Hubble Space Telescope* Observations of the Local Group Dwarf Galaxy Leo I.

LEE, YOUNG-WOOK. The Ultraviolet Upturn in Elliptical Galaxies as an Age Indicator. *Sukyoung Yi, Young-Wook Lee, Jong-Hak Woo, Jang-Hyun Park, Pierre Demarque, & Augustus Oemler, Jr.* 513, 128 (1999)

LE FÈVRE, OLIVIER. The Canada-UK Deep Submillimeter Survey: First Submillimeter Images, the Source Counts, and Resolution of the Background. *Stephen Eales, Simon Lilly, Walter Gear, Loretta Dunne, J. Richard Bond, Francois Hammer, Olivier Le Fèvre, & David Crampton.* 515, 518 (1999)

LEHNERT, MATTHEW D. *ASCA* Observations of the Starburst-driven Superwind Galaxy NGC 2146: Broadband (0.6–9 keV) Spectral Properties. *Roberto Della Ceca, Richard E. Griffiths, Timothy M. Heckman, Matthew D. Lehnert, & Kimberly A. Weaver.* 514, 772 (1999)

On the Structure and Morphology of the "Diffuse Ionized Medium" in Star-forming Galaxies. *Jing Wang, Timothy M. Heckman, & Matthew D. Lehnert.* 515, 97 (1999)

LEITHERER, CLAUS. Multiwavelength Study of the Starburst Galaxy NGC 7714. I. Ultraviolet-Optical Spectroscopy. *Rosa M. González Delgado, María Luisa García-Vargas, Jeff Goldader, Claus Leitherer, & Anna Pasquali.* 513, 707 (1999)

Evolutionary Synthesis Modeling of Red Supergiant Features in the Near-Infrared. *Livia Origlia, Jeffrey D. Goldader, Claus Leitherer, Daniel Schaerer, & Ernesto Oliva.* 514, 96 (1999)

LEMKE, R. See ANDREANI, P., et al. The Enhancement and Decrement of the Sunyaev-Zeldovich Effect toward the *ROSAT* Cluster RX J0658−5557.

LÉPINE, SÉBASTIEN. Wind Inhomogeneities in Wolf-Rayet Stars. II. Investigation of Emission-Line Profile Variations. *Sébastien Lépine & Anthony F. J. Moffat.* 514, 909 (1999)

LETELIER, PATRICIO S. Relativistic and Newtonian Core-Shell Models: Analytical and Numerical Results. *Werner M. Vieira & Patricio S. Letelier.* 513, 383 (1999)

LEUNG, P. T. The Quadrupole Oscillations of Strange Quark Stars. *C. W. Yip, M.-C. Chu, & P. T. Leung.* 513, 849 (1999)

LEWIN, W. H. G. See VAN DER HOOFT, F., et al. Hard X-Ray Variability of the Black Hole Candidate GRO J0422+32 during Its 1992 Outburst.

LEWIS, GERAINT F. Substructure in Dark Halos: Orbital Eccentricities and Dynamical Friction. *Frank C. van den Bosch, Geraint F. Lewis, George Lake, & Joachim Stadel.* 515, 50 (1999)

LI, H. Rossby Wave Instability of Keplerian Accretion Disks. *R. V. E. Lovelace, H. Li, S. A. Colgate, & A. F. Nelson.* 513, 805 (1999)

LI, JI. A Model for Calculating the Abundances of Neutron-Capture Elements in Metal-poor Stars. *Bo Zhang, Ji Li, Caixia Zhang, Yanchun Liang, & Qiuhe Peng.* 513, 910 (1999)

LI, JIANKE. Accretion Disk Reversal and the Spin-up/Spin-down of Accreting Pulsars. *James R. Murray, Martijn de Kool, & Jianke Li.* 515, 738 (1999)

LI, PENG. The Solar Flare Soft X-Ray Differential Emission Measure and the Neupert Effect at Different Temperatures. *James M. McTiernan, George H. Fisher, & Peng Li.* 514, 472 (1999)

LI, T. P. X-Ray Shots of Cygnus X-1. *Y. X. Feng, T. P. Li, & L. Chen.* 514, 373 (1999)

LI, W. D. New Wolf-Rayet Galaxies with Detection of WC Stars. *J. H. Huang, Q. S. Gu, L. Ji, W. D. Li, J. Y. Wei, & W. Zheng.* 513, 215 (1999)

LI, X.-D. Could 2S 0114+650 Be a Magnetar? *X.-D. Li & E. P. J. van den Heuvel.* 513, L45 (1999)

Disk Accretion onto Magnetized Neutron Stars: The Inner Disk Radius and Fastness Parameter. *X.-D. Li & Z.-R. Wang.* 513, 845 (1999)

LIANG, H. See ANDREANI, P., et al. The Enhancement and Decrement of the Sunyaev-Zeldovich Effect toward the *ROSAT* Cluster RX J0658−5557.

LIANG, YANCHUN. A Model for Calculating the Abundances of Neutron-Capture Elements in Metal-poor Stars. *Bo Zhang, Ji Li, Caixia Zhang, Yanchun Liang, & Qiuhe Peng.* 513, 910 (1999)

LIDMAN, C. The Redshift of the Gravitationally Lensed Radio Source PKS 1830−211. *C. Lidman, F. Courbin, G. Meylan, T. Broadhurst, B. Frye, & W. J. W. Welch.* 514, L57 (1999)

LIEBERT, JAMES. On the Nature of the Peculiar Hot Star in the Young Large Magellanic Cloud Cluster NGC 1818. *James Liebert.* 514, L25 (1999)

LIKKEL, LAUREN. The "Water-Fountain Nebula" IRAS 16342−3814: *Hubble Space Telescope*/Very Large Array Study of a Bipolar Protoplanetary Nebula. *Raghvendra Sahai, Peter te Lintel Hekkert, Mark Morris, Albert Zijlstra, & Lauren Likkel.* 514, L115 (1999)

LILLY, SIMON. The Canada-UK Deep Submillimeter Survey: First Submillimeter Images, the Source Counts, and Resolution of the Background. *Stephen Eales, Simon Lilly, Walter Gear, Loretta Dunne, J. Richard Bond, Francois Hammer, Olivier Le Fèvre, & David Crampton.* 515, 518 (1999)

LIM, T. Water Ice, Silicate, and Polycyclic Aromatic Hydrocarbon Emission Features in the *Infrared Space Observatory* Spectrum of the Carbon-rich Planetary Nebula CPD −56°8032. *Martin Cohen, M. J. Barlow, R. J. Sylvester, X.-W. Liu, P. Cox, T. Lim, B. Schmitt, & A. K. Speck.* 513, L135 (1999)

LIN, D. N. C. Tidally Induced Gap Formation in Protostellar Disks: Gap Clearing and Suppression of Protoplanetary Growth. *G. Bryden, Xingming Chen, D. N. C. Lin, Richard P. Nelson, & John C. B. Papaloizou.* 514, 344 (1999)

LIN, HAOSHENG. The Granular Magnetic Fields of the Quiet Sun. *Haosheng Lin & Thomas Rimmele.* 514, 448 (1999)

LINDSEY, C. Helioseismic Images of an Active Region Complex. *D. C. Braun & C. Lindsey.* 513, L79 (1999)

Seismic Images of a Solar Flare. *A.-C. Donea, D. C. Braun, & C. Lindsey.* 513, L143 (1999)

LINSKY, JEFFREY L. The Active Corona of HD 35850 (F8 V). *Marc Gagné, Jeff A. Valenti, Jeffrey L. Linsky, Gianpiero Tagliaferri, Stefano Covino, & Manuel Güdel.* 515, 423 (1999)

LITVINENKO, YURI E. Photospheric Magnetic Reconnection and Canceling Magnetic Features on the Sun. *Yuri E. Litvinenko.* 515, 435 (1999)

LIU, X.-W. Water Ice, Silicate, and Polycyclic Aromatic Hydrocarbon Emission Features in the *Infrared Space Observatory* Spectrum of the Carbon-rich Planetary Nebula CPD −56°8032. *Martin Cohen, M. J. Barlow, R. J. Sylvester, X.-W. Liu, P. Cox, T. Lim, B. Schmitt, & A. K. Speck.* 513, L135 (1999)

LOBANOV, ANDREW P. See FALCKE, HEINO, et al. A Major Radio Outburst in III Zw 2 with an Extremely Inverted, Millimeter-peaked Spectrum.

LOEB, ABRAHAM. Constraints from the Hubble Deep Field on High-Redshift Quasar Models. *Zoltán Haiman, Piero Madau, & Abraham Loeb.* 514, 535 (1999)

A Subrelativistic Shock Model for the Radio Emission of SN 1998bw. *Eli Waxman & Abraham Loeb.* 515, 721 (1999)

LONG, KNOX S. The Far-Ultraviolet Spectrum and Short-Timescale Variability of AM Herculis from Observations with the Hopkins Ultraviolet Telescope. *Bradford W. Greeley, William P. Blair, Knox S. Long, & John C. Raymond.* 513, 491 (1999)

López, J. Alberto. Radio Continuum and Recombination Line Observations of the Polypolar Planetary Nebula NGC 2440. *Roberto Vázquez, José M. Torrelles, Luis F. Rodríguez, Yolanda Gómez, J. Alberto López, & Luis F. Miranda.* 515, 633 (1999)

Lopez, Sebastian. First Comparison of Ionization and Metallicity in Two Lines of Sight toward HE 1104−1805A,B at $z = 1.66$. *Sebastian Lopez, Dieter Reimers, Michael Rauch, Wallace L. W. Sargent, & Alain Smette.* 513, 598 (1999)

Lord, Steven D. The Eastern Arm of M83 Revisited: High-Resolution Mapping of ^{12}CO 1–0 Emission. *Richard J. Rand, Steven D. Lord, & James L. Higdon.* 513, 720 (1999)

Lovelace, R. V. E. Rossby Wave Instability of Keplerian Accretion Disks. *R. V. E. Lovelace, H. Li, S. A. Colgate, & A. F. Nelson.* 513, 805 (1999)

Magnetic Propeller Outflows. *R. V. E. Lovelace, M. M. Romanova, & G. S. Bisnovatyi-Kogan.* 514, 368 (1999)

Hydrodynamic Simulations of Counterrotating Accretion Disks. *O. A. Kuznetsov, R. V. E. Lovelace, M. M. Romanova, & V. M. Chechetkin.* 514, 691 (1999)

Lowenstein, Michael. *Rossi X-Ray Timing Explorer* Hard X-Ray Observation of Abell 754: Constraining the Hottest Temperature Component and the Intracluster Magnetic Field. *Azita Valinia, Mark J. Henriksen, Michael Lowenstein, Kurt Roettiger, Richard F. Mushotzky, & Greg Madejski.* 515, 42 (1999)

Lowrance, Patrick J. See Schneider, Glenn, et al. NICMOS Imaging of the HR 4796A Circumstellar Disk.

Lu, Limin. Highly Ionized High-Velocity Clouds: Intergalactic Gas in the Local Group or Distant Gas in the Galactic Halo? *Kenneth R. Sembach, Blair D. Savage, Limin Lu, & Edward M. Murphy.* 515, 108 (1999)

Lubow, S. H. The Effect of an Isothermal Atmosphere on the Propagation of Three-dimensional Waves in a Thermally Stratified Accretion Disk. *G. I. Ogilvie & S. H. Lubow.* 515, 767 (1999)

Luciani, J. F. Confined Disruption of a Three-dimensional Twisted Magnetic Flux Tube. *T. Amari & J. F. Luciani.* 515, L81 (1999)

Lunine, Jonathan I. Reflected Spectra and Albedos of Extrasolar Giant Planets. I. Clear and Cloudy Atmospheres. *Mark S. Marley, Christopher Gelino, Denise Stephens, Jonathan I. Lunine, & Richard Freedman.* 513, 879 (1999)

Lyons, K. See Chadwick, P. M., et al. Very High Energy Gamma Rays from PKS 2155−304.

Maccacaro, Tommaso. The REX Survey: A Search for Radio-emitting X-Ray Sources. *Alessandro Caccianiga, Tommaso Maccacaro, Anna Wolter, Roberto Della Ceca, & Isabella M. Gioia.* 513, 51 (1999)

Macchetto, F. Duccio. The Globular Cluster System in the Inner Region of M87. *Arunav Kundu, Bradley C. Whitmore, William B. Sparks, F. Duccio Macchetto, Stephen E. Zepf, & Keith M. Ashman.* 513, 733 (1999)

Maciejewski, Andrzej J. Resonance in PSR B1257+12 Planetary System. *Maciej Konacki, Andrzej J. Maciejewski, & Alex Wolszczan.* 513, 471 (1999)

Mac Low, Mordecai-Mark. Starburst-driven Mass Loss from Dwarf Galaxies: Efficiency and Metal Ejection. *Mordecai-Mark Mac Low & Andrea Ferrara.* 513, 142 (1999)

Macomb, D. J. A Gamma-Ray Flare from PKS 2255−282. *D. J. Macomb, N. Gehrels, & C. R. Shrader.* 513, 652 (1999)

Macri, Lucas. See Silbermann, N. A., et al. The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XIV. The Cepheids in NGC 1365.

Macri, Lucas M. See Kelson, Daniel D., et al. The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XIX. The Discovery of Cepheids in and a New Distance to NGC 3198.

Madau, Piero. Constraints from the Hubble Deep Field on High-Redshift Quasar Models. *Zoltán Haiman, Piero Madau, & Abraham Loeb.* 514, 535 (1999)

Radiative Transfer in a Clumpy Universe. III. The Nature of Cosmological Ionizing Sources. *Piero Madau, Francesco Haardt, & Martin J. Rees.* 514, 648 (1999)

Madejski, G. M. See Kataoka, J., et al. High-Energy Emission from the TeV Blazar Markarian 501 during Multiwavelength Observations in 1996.

Madejski, Greg. *Rossi X-Ray Timing Explorer* Hard X-Ray Observation of Abell 754: Constraining the Hottest Temperature Component and the Intracluster Magnetic Field. *Azita Valinia, Mark J. Henriksen, Michael Lowenstein, Kurt Roettiger, Richard F. Mushotzky, & Greg Madejski.* 515, 42 (1999)

Madore, Barry F. See Kelson, Daniel D., et al. The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XIX. The Discovery of Cepheids in and a New Distance to NGC 3198.

See Silbermann, N. A., et al. The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XIV. The Cepheids in NGC 1365.

The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XV. A Cepheid Distance to the Fornax Cluster and Its Implications. *Barry F. Madore, Wendy L. Freeman, N. Silbermann, Paul Harding, John Huchra, Jeremy R. Mould, John A. Graham, Laura Ferrarese, Brad K. Gibson, Mingsheng Han, John G. Hoessel, Shaun M. Hughes, Garth D. Illingworth, Randy Phelps, Shoko Sakai, & Peter Stetson.* 515, 29 (1999)

Magara, Tetsuya. Evolution of Eruptive Flares. II. The Occurrence of Locally Enhanced Resistivity. *Tetsuya Magara & Kazunari Shibata.* 514, 456 (1999)

Makino, F. See Kataoka, J., et al. High-Energy Emission from the TeV Blazar Markarian 501 during Multiwavelength Observations in 1996.

Malbet, F. Sub–Astronomical Unit Structure of the Near-Infrared Emission from AB Aurigae. *R. Millan-Gabet, F. P. Schloerb, W. A. Traub, F. Malbet, J. P. Berger, & J. D. Bregman.* 513, L131 (1999)

Malkan, Matthew A. A Narrowband Imaging Search for [O III] Emission from Galaxies at $z > 3$. *Harry I. Teplitz, Matthew A. Malkan, & Ian S. McLean.* 514, 33 (1999)

Manchado, Arturo. *Infrared Space Observatory* Observations of IRAS 16594−4656: A New Proto–Planetary Nebula with a Strong 21 Micron Dust Feature. *Pedro García-Lario, Arturo Manchado, Ana Ulla, & Minia Manteiga.* 513, 941 (1999)

Manteiga, Minia. *Infrared Space Observatory* Observations of IRAS 16594−4656: A New Proto–Planetary Nebula with a Strong 21 Micron Dust Feature. *Pedro García-Lario, Arturo Manchado, Ana Ulla, & Minia Manteiga.* 513, 941 (1999)

Mar, S. Experimental Stark Widths and Shifts of Several Ne I Spectral Lines. *J. A. del Val, J. A. Aparicio, & S. Mar.* 513, 535 (1999)

Mariska, John T. Hard and Soft X-Ray Observations of Occulted and Nonocculted Solar Limb Flares. *John T. Mariska & James M. McTiernan.* 514, 484 (1999)

Markevitch, M. A Hot Spot in Coma. *R. Hank Donnelly, M. Markevitch, W. Forman, C. Jones, E. Churazov, & M. Gilfanov.* 513, 690 (1999)

Markwardt, Craig B. Variable-Frequency Quasi-periodic Oscillations from the Galactic Microquasar GRS 1915+105. *Craig B. Markwardt, Jean H. Swank, & Ronald E. Taam.* 513, L37 (1999)

Marley, Mark S. Reflected Spectra and Albedos of Extrasolar Giant Planets. I. Clear and Cloudy Atmospheres. *Mark S. Marley, Christopher Gelino, Denise Stephens, Jonathan I. Lunine, & Richard Freedman.* 513, 879 (1999)

Marquette, William. See Chou, Dean-Yi, et al. Acoustic Imaging in Helioseismology.

Martin, Crystal L. Properties of Galactic Outflows: Measurements of the Feedback from Star Formation. *Crystal L. Martin.* 513, 156 (1999)

Martín, I. Analysis of the Triplet Transitions from the $3d^2$ Configuration in Fe VII. *E. Charro & I. Martín.* 513, 997 (1999)

Martínez, Héctor J. Quasar-Galaxy and AGN-Galaxy Cross-Correlations. *Héctor J. Martínez, Manuel E. Merchán, Carlos A. Valotto, & Diego G. Lambas.* 514, 558 (1999)

Martínez, Vicent J. A Global Descriptor of Spatial Pattern Interaction in the Galaxy Distribution. *Martin Kerscher, María Jesús Pons-Bordería, Jens Schmalzing, Roberto Trasarti-Battistoni, Thomas Buchert, Vicent J. Martínez, & Riccardo Valdarnini.* 513, 543 (1999)

Martinis, L. See Andreani, P., et al. The Enhancement and Decrement of the Sunyaev-Zeldovich Effect toward the *ROSAT* Cluster RX J0658−5557.

Martos, Marco. The Collisions of High-Velocity Clouds with a Magnetized Gaseous Galactic Disk. *Alfredo Santillán, José Franco, Marco Martos, & Jongsoo Kim.* 515, 657 (1999)

Marziani, P. The Close Environment of Seyfert Galaxies and Its Implication for Unification Models. *D. Dultzin-Hacyan, Y. Krongold, I. Fuentes-Guridi, & P. Marziani.* 513, L111 (1999)

Mateo, Mario. See Gallart, Carme, et al. *Hubble Space Telescope* Observations of the Local Group Dwarf Galaxy Leo I.

Mathews, William G. A Comparison of Metal Enrichment Histories in Rich Clusters and Individual Luminous Elliptical Galaxies. *Fabrizio Brighenti & William G. Mathews.* 515, 542 (1999)

Mathur, Smita. Investigation of the Relation between the Spectral Energy Distributions and the Emission Lines in Low-Redshift Quasars. *Belinda J.*

Wilkes, Joanna Kuraszkiewicz, Paul J. Green, Smita Mathur, & Jonathan C. McDowell. 513, 76 (1999)

MATSUOKA, M. Broadband X-Ray Observations of the Narrow-Line X-Ray Galaxy NGC 5506. *T. Wang, T. Mihara, C. Otani, M. Matsuoka, & H. Awaki.* 515, 567 (1999)

MATT, GIORGIO. Hard X-Ray Radiation in the Coma Cluster Spectrum. *Roberto Fusco-Femiano, Daniele Dal Fiume, Luigina Feretti, Gabriele Giovannini, Paola Grandi, Giorgio Matt, Silvano Molendi, & Andrea Santangelo.* 513, L21 (1999)

MATTEUCCI, FRANCESCA. On the Origin of Damped Lyα Systems: A Case for Low Surface Brightness Galaxies? *Raul Jimenez, David V. Bowen, & Francesca Matteucci.* 514, L83 (1999)

The Earliest Phases of Galaxy Evolution. *Cristina Chiappini, Francesca Matteucci, Timothy C. Beers, & Ken'ichi Nomoto.* 515, 226 (1999)

MATTHEWS, HENRY E. JCMT Observations of Cometary Clouds in the Galactic Chimney near W4. *A. R. Taylor, Judith A. Irwin, Henry E. Matthews, & Mark H. Heyer.* 513, 339 (1999)

See WILSON, CHRISTINE D., et al. Submillimeter Continuum Emission in the ρ Ophiuchi Molecular Cloud: Filaments, Arcs, and an Unidentified Far-Infrared Object.

MATTHEWS, K. High Spatial Resolution Imaging of Arp 220 from 3 to 25 Microns. *B. T. Soifer, G. Neugebauer, K. Matthews, E. E. Becklin, M. Ressler, M. W. Werner, A. J. Weinberger, & E. Egami.* 513, 207 (1999)

MATTOX, J. R. See KATAOKA, J., et al. High-Energy Emission from the TeV Blazar Markarian 501 during Multiwavelength Observations in 1996.

MAUROGORDATO, S. Biasing and High-Order Statistics from the Southern-Sky Redshift Survey. *C. Benoist, A. Cappi, L. N. da Costa, S. Maurogordato, F. R. Bouchet, & R. Schaeffer.* 514, 563 (1999)

MCARTHUR, BARBARA E. *Hubble Space Telescope* Fine Guidance Sensor Astrometric Parallaxes for Three Dwarf Novae: SS Aurigae, SS Cygni, and U Geminorum. *Thomas E. Harrison, Bernard J. McNamara, Paula Szkody, Barbara E. McArthur, G. F. Benedict, Arnold R. Klemola, & Ronald L. Gilliland.* 515, L93 (1999)

MCCARTHY, M. C. Laboratory Detection of the Ring-Chain Carbenes HC_4N and HC_6N. *M. C. McCarthy, J.-U. Grabow, M. J. Travers, W. Chen, C. A. Gottlieb, & P. Thaddeus.* 513, 305 (1999)

MCCOLLOUGH, M. See HJELLMING, R. M., et al. Radio and X-Ray Observations of the 1998 Outburst of the Recurrent X-Ray Transient 4U 1630−47.

MCCOMB, T. J. L. See CHADWICK, P. M., et al. Very High Energy Gamma Rays from PKS 2155−304.

MCDOWELL, JONATHAN C. Investigation of the Relation between the Spectral Energy Distributions and the Emission Lines in Low-Redshift Quasars. *Belinda J. Wilkes, Joanna Kuraszkiewicz, Paul J. Green, Smita Mathur, & Jonathan C. McDowell.* 513, 76 (1999)

MCEWAN, MURRAY J. New H and H_2 Reactions with Small Hydrocarbon Ions and Their Roles in Benzene Synthesis in Dense Interstellar Clouds. *Murray J. McEwan, Graham B. I. Scott, Nigel G. Adams, Lucia M. Babcock, R. Terzieva, & Eric Herbst.* 513, 287 (1999)

MCGAUGH, STACY S. The Molecular ISM in Low Surface Brightness Disk Galaxies. *J. Christopher Mihos, Marco Spaans, & Stacy S. McGaugh.* 515, 89 (1999)

MCINTOSH, D. H. A Statistical Study of Rest-Frame Optical Emission Properties in Luminous Quasars at $2.0 \leq z \leq 2.5$. *D. H. McIntosh, M. J. Rieke, H.-W. Rix, C. B. Foltz, & R. J. Weymann.* 514, 40 (1999)

MCKENZIE, D. E. A Stable Filament Cavity with a Hot Core. *H. S. Hudson, L. W. Acton, K. L. Harvey, & D. E. McKenzie.* 513, L83 (1999)

MCLEAN, IAN S. A Narrowband Imaging Search for [O III] Emission from Galaxies at $z > 3$. *Harry I. Teplitz, Matthew A. Malkan, & Ian S. McLean.* 514, 33 (1999)

Massive Stars in the Quintuplet Cluster. *Donald F. Figer, Ian S. McLean, & Mark Morris.* 514, 202 (1999)

MCLIN, KEVIN M. *Hubble Space Telescope* Images and Spectra of the Remnant of SN 1885 in M31. *Robert A. Fesen, Christopher L. Gerardy, Kevin M. McLin, & Andrew J. S. Hamilton.* 514, 195 (1999)

MCNAMARA, BERNARD J. *Hubble Space Telescope* Fine Guidance Sensor Astrometric Parallaxes for Three Dwarf Novae: SS Aurigae, SS Cygni, and U Geminorum. *Thomas E. Harrison, Bernard J. McNamara, Paula Szkody, Barbara E. McArthur, G. F. Benedict, Arnold R. Klemola, & Ronald L. Gilliland.* 515, L93 (1999)

MCTIERNAN, JAMES M. The Solar Flare Soft X-Ray Differential Emission Measure and the Neupert Effect at Different Temperatures. *James M. McTiernan, George H. Fisher, & Peng Li.* 514, 472 (1999)

Hard and Soft X-Ray Observations of Occulted and Nonocculted Solar Limb Flares. *John T. Mariska & James M. McTiernan.* 514, 484 (1999)

MEIER, ROLAND. See SCHNEIDER, GLENN, et al. NICMOS Imaging of the HR 4796A Circumstellar Disk.

MELATOS, ANDREW. Origin of the Transient, Unpulsed Radio Emission from the PSR B1259−63 Binary System. *Lewis Ball, Andrew Melatos, Simon Johnston, & Olaf Skjæraasen.* 514, L39 (1999)

MELIKIAN, N. D. Spectral, Photometric, and Polarimetric Study of Visual Binary COU 14. *V. S. Tamazian, J. A. Docobo, & N. D. Melikian.* 513, 933 (1999)

MENDEZ, MARIANO. Discovery of Twin Kilohertz Quasi-periodic Oscillations in the High Galactic Latitude X-Ray Transient XTE J2123−058. *Jeroen Homan, Mariano Mendez, Rudy Wijnands, Michiel van der Klis, & Jan van Paradijs.* 513, L119 (1999)

MENOU, KRISTEN. A Population of Faint Nontransient Low-Mass Black Hole Binaries. *Kristen Menou, Ramesh Narayan, & Jean-Pierre Lasota.* 513, 811 (1999)

MENTEN, KARL M. The Synchrotron Jet from the H_2O Maser Source in W3(OH). *D. J. Wilner, M. J. Reid, & Karl M. Menten.* 513, 775 (1999)

Hot Gas and Dust in a Protostellar Cluster near W3(OH). *Friedrich Wyrowski, Peter Schilke, C. Malcolm Walmsley, & Karl M. Menten.* 514, L43 (1999)

MERCHÁN, MANUEL E. Quasar-Galaxy and AGN-Galaxy Cross-Correlations. *Héctor J. Martínez, Manuel E. Merchán, Carlos A. Valotto, & Diego G. Lambas.* 514, 558 (1999)

METZGER, MARK R. A Lensed Arc in the Low-Redshift Cluster Abell 2124. *John P. Blakeslee & Mark R. Metzger.* 513, 592 (1999)

MEUNIER, N. Fractal Analysis of Michelson Doppler Imager Magnetograms: A Contribution to the Study of Solar Active Regions. *N. Meunier.* 515, 801 (1999)

MEYLAN, G. The Redshift of the Gravitationally Lensed Radio Source PKS 1830−211. *C. Lidman, F. Courbin, G. Meylan, T. Broadhurst, B. Frye, & W. J. W. Welch.* 514, L57 (1999)

MIHARA, T. Broadband X-Ray Observations of the Narrow-Line X-Ray Galaxy NGC 5506. *T. Wang, T. Mihara, C. Otani, M. Matsuoka, & H. Awaki.* 515, 567 (1999)

MIHOS, J. CHRISTOPHER. The Molecular ISM in Low Surface Brightness Disk Galaxies. *J. Christopher Mihos, Marco Spaans, & Stacy S. McGaugh.* 515, 89 (1999)

MILLAN-GABET, R. Sub–Astronomical Unit Structure of the Near-Infrared Emission from AB Aurigae. *R. Millan-Gabet, F. P. Schloerb, W. A. Traub, F. Malbet, J. P. Berger, & J. D. Bregman.* 513, L131 (1999)

MILLER, M. COLEMAN. Evidence for Antipodal Hot Spots during X-Ray Bursts from 4U 1636−536. *M. Coleman Miller.* 515, L77 (1999)

MILNE, DOUGLAS K. Supernova Remnants in the Magellanic Clouds. II. Supernova Remnant Breakouts from N11L and N86. *Rosa Murphy Williams, You-Hua Chu, John R. Dickel, R. Chris Smith, Douglas K. Milne, & P. Frank Winkler.* 514, 798 (1999)

MIODUSZEWSKI, A. J. See HJELLMING, R. M., et al. Radio and X-Ray Observations of the 1998 Outburst of the Recurrent X-Ray Transient 4U 1630−47.

MIRALDA-ESCUDÉ, JORDI. Microlensing in the Galactic Bulge: Effects of the Disk behind the Bulge. *Vibhat Nair & Jordi Miralda-Escudé.* 515, 206 (1999)

MIRALLES, J. A. Evolution of Proto–Neutron Stars. *J. A. Pons, S. Reddy, M. Prakash, J. M. Lattimer, & J. A. Miralles.* 513, 780 (1999)

MIRANDA, LUIS F. Radio Continuum and Recombination Line Observations of the Polypolar Planetary Nebula NGC 2440. *Roberto Vázquez, José M. Torrelles, Luis F. Rodríguez, Yolanda Gómez, J. Alberto López, & Luis F. Miranda.* 515, 633 (1999)

MISSELT, K. A. A Reanalysis of the Ultraviolet Extinction from Interstellar Dust in the Large Magellanic Cloud. *K. A. Misselt, Geoffrey C. Clayton, & Karl D. Gordon.* 515, 128 (1999)

MITCHELL, GEORGE F. See WILSON, CHRISTINE D., et al. Submillimeter Continuum Emission in the ρ Ophiuchi Molecular Cloud: Filaments, Arcs, and an Unidentified Far-Infrared Object.

MITMAN, KURT E. Short-Timescale Variability in the External Shock Model of Gamma-Ray Bursts. *Charles D. Dermer & Kurt E. Mitman.* 513, L5 (1999)

MIYAMA, SHOKEN M. Magnetorotational Instability in Protoplanetary Disks. I. On the Global Stability of Weakly Ionized Disks with Ohmic Dissipation. *Takayoshi Sano & Shoken M. Miyama.* 515, 776 (1999)

MIYAZAKI, ATSUSHI. A High-Velocity Molecular Cloud near the Center of the Galaxy. *Tomoharu Oka, Glenn J. White, Tetsuo Hasegawa, Fumio Sato, Masato Tsuboi, & Atsushi Miyazaki.* 515, 249 (1999)

MOBLEY, D. See BODEN, A. F., et al. The Visual Orbit of ι Pegasi.

MODERSKI, RAFAL. A Comment on the Viscous Stability of Relativistic Keplerian Accretion Disks. *Rafal Moderski & Bozena Czerny.* 513, L123 (1999)

MOFFAT, ANTHONY F. J. Wind Inhomogeneities in Wolf-Rayet Stars. II. Investigation of Emission-Line Profile Variations. *Sébastien Lépine & Anthony F. J. Moffat.* 514, 909 (1999)

MOLENDI, S. See DE GRANDI, S., et al. The X-Ray Luminosity Function of Bright Galaxy Clusters in the Local Universe.

See DE GRANDI, S., et al. A Flux-limited Sample of Bright Clusters of Galaxies from the Southern Part of the *ROSAT* All-Sky Survey: The Catalog and log N–log$S$.

MOLENDI, SILVANO. Hard X-Ray Radiation in the Coma Cluster Spectrum. *Roberto Fusco-Femiano, Daniele Dal Fiume, Luigina Feretti, Gabriele Giovannini, Paola Grandi, Giorgio Matt, Silvano Molendi, & Andrea Santangelo.* 513, L21 (1999)

MOLLÁ, MERCEDES. The Stellar Populations of Spiral Disks. II. Measuring and Modeling the Radial Distribution of Absorption Spectral Indices. *Mercedes Mollá, Eduardo Hardy, & Dominique Beauchamp.* 513, 695 (1999)

Modeling the Radial Abundance Distribution of the Transition Galaxy NGC 1313. *Mercedes Mollá & Jean-René Roy.* 514, 781 (1999)

MONTUORI, M. Fractal Correlations in the CfA2–South Redshift Survey. *M. Joyce, M. Montuori, & F. Sylos Labini.* 514, L5 (1999)

MORAN, EDWARD C. Polarized Broad Hα Emission from the LINER Nucleus of NGC 1052. *Aaron J. Barth, Alexei V. Filippenko, & Edward C. Moran.* 515, L61 (1999)

MORIARTY-SCHIEVEN, GERALD H. See WILSON, CHRISTINE D., et al. Submillimeter Continuum Emission in the ρ Ophiuchi Molecular Cloud: Filaments, Arcs, and an Unidentified Far-Infrared Object.

MORRIS, MARK. Massive Stars in the Quintuplet Cluster. *Donald F. Figer, Ian S. McLean, & Mark Morris.* 514, 202 (1999)

The "Water-Fountain Nebula" IRAS 16342−3814: *Hubble Space Telescope*/Very Large Array Study of a Bipolar Protoplanetary Nebula. *Raghvendra Sahai, Peter te Lintel Hekkert, Mark Morris, Albert Zijlstra, & Lauren Likkel.* 514, L115 (1999)

MORSINK, SHARON M. Relativistic Precession around Rotating Neutron Stars: Effects Due to Frame Dragging and Stellar Oblateness. *Sharon M. Morsink & Luigi Stella.* 513, 827 (1999)

MOTTE, F. Discovery of an Extremely Young Accreting Protostar in Taurus. *P. André, F. Motte, & A. Bacmann.* 513, L57 (1999)

MOULD, JEREMY R. See KELSON, DANIEL D., et al. The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XIX. The Discovery of Cepheids in and a New Distance to NGC 3198.

See SILBERMANN, N. A., et al. The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XIV. The Cepheids in NGC 1365.

See MADORE, BARRY F., et al. The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XV. A Cepheid Distance to the Fornax Cluster and Its Implications.

See PAHRE, MICHAEL A., et al. Detection of Surface Brightness Fluctuations in NGC 4373 Using the *Hubble Space Telescope*.

See KRIST, JOHN E., et al. *Hubble Space Telescope* WFPC2 Imaging of XZ Tauri: Time Evolution of a Herbig-Haro Bow Shock.

MÜCKET, J. P. Temperature Anisotropies and Distortions Induced by Hot Intracluster Gas on the Cosmic Microwave Background. *F. Atrio-Barandela & J. P. Mücket.* 515, 465 (1999)

MÜLLER, V. Self-regulating Galaxy Formation as an Explanation for the Tully-Fisher Relation. *D. Elizondo, G. Yepes, R. Kates, V. Müller, & A. Klypin.* 515, 525 (1999)

MULCHAEY, JOHN S. The Isolated Elliptical Galaxy NGC 1132: Evidence for a Merged Group of Galaxies? *John S. Mulchaey & Ann I. Zabludoff.* 514, 133 (1999)

MULLAN, DERMOTT. Heating and Acceleration of the Solar Wind via Gravity Damping of Alfvén Waves. *Iolanda Cuseri, Dermott Mullan, Giancarlo Noci, & Giannina Poletto.* 514, 989 (1999)

MULLER, J. M. Bursts from GS 1826−238: A Clocked Thermonuclear Flashes Generator. *P. Ubertini, A. Bazzano, M. Cocchi, L. Natalucci, J. Heise, J. M. Muller, & J. J. M. in 't Zand.* 514, L27 (1999)

MURPHY, EDWARD M. Highly Ionized High-Velocity Clouds: Intergalactic Gas in the Local Group or Distant Gas in the Galactic Halo? *Kenneth R. Sembach, Blair D. Savage, Limin Lu, & Edward M. Murphy.* 515, 108 (1999)

MURPHY WILLIAMS, ROSA. Supernova Remnants in the Magellanic Clouds. II. Supernova Remnant Breakouts from N11L and N86. *Rosa Murphy Williams, You-Hua Chu, John R. Dickel, R. Chris Smith, Douglas K. Milne, & P. Frank Winkler.* 514, 798 (1999)

MURRAY, JAMES R. Accretion Disk Reversal and the Spin-up/Spin-down of Accreting Pulsars. *James R. Murray, Martijn de Kool, & Jianke Li.* 515, 738 (1999)

MUSHOTZKY, RICHARD F. *Rossi X-Ray Timing Explorer* Hard X-Ray Observation of Abell 754: Constraining the Hottest Temperature Component and the Intracluster Magnetic Field. *Azita Valinia, Mark J. Henriksen, Michael Lowenstein, Kurt Roettiger, Richard F. Mushotzky, & Greg Madejski.* 515, 42 (1999)

MYERS, PHILIP C. A High-Resolution Study of the Slowly Contracting, Starless Core L1544. *Jonathan P. Williams, Philip C. Myers, David J. Wilner, & James Di Francesco.* 513, L61 (1999)

NAIR, VIBHAT. Microlensing in the Galactic Bulge: Effects of the Disk behind the Bulge. *Vibhat Nair & Jordi Miralda-Escudé.* 515, 206 (1999)

NAKAMURA, FUMITAKA. On the Mass of Population III Stars. *Fumitaka Nakamura & Masayuki Umemura.* 515, 239 (1999)

NAKARIAKOV, V. M. Slow Magnetosonic Waves in Coronal Plumes. *L. Ofman, V. M. Nakariakov, & C. E. DeForest.* 514, 441 (1999)

NANDRA, KIRPAL. A Cutoff in the X-Ray Fluctuation Power Density Spectrum of the Seyfert 1 Galaxy NGC 3516. *Rick Edelson & Kirpal Nandra.* 514, 682 (1999)

NARAYAN, RAMESH. A Population of Faint Nontransient Low-Mass Black Hole Binaries. *Kristen Menou, Ramesh Narayan, & Jean-Pierre Lasota.* 513, 811 (1999)

Thermal X-Ray Line Emission from Accreting Black Holes. *Ramesh Narayan & John Raymond.* 515, L69 (1999)

NARAYANAN, VIJAY K. A Precision Test of *Hipparcos* Systematics toward the Hyades. *Vijay K. Narayanan & Andrew Gould.* 515, 256 (1999)

Recovering the Primordial Density Fluctuations: A Comparison of Methods. *Vijay K. Narayanan & Rupert A. C. Croft.* 515, 471 (1999)

NATALUCCI, L. Bursts from GS 1826−238: A Clocked Thermonuclear Flashes Generator. *P. Ubertini, A. Bazzano, M. Cocchi, L. Natalucci, J. Heise, J. M. Muller, & J. J. M. in 't Zand.* 514, L27 (1999)

NAVARRO, JULIO F. The Cosmological Origin of the Tully-Fisher Relation. *Matthias Steinmetz & Julio F. Navarro.* 513, 555 (1999)

NEILSEN, ERIC H., JR. The Color Distributions of Globular Clusters in Virgo Elliptical Galaxies. *Eric H. Neilsen, Jr., & Zlatan I. Tsvetanov.* 515, L13 (1999)

NELSON, A. F. Rossby Wave Instability of Keplerian Accretion Disks. *R. V. E. Lovelace, H. Li, S. A. Colgate, & A. F. Nelson.* 513, 805 (1999)

NELSON, RICHARD P. Tidally Induced Gap Formation in Protostellar Disks: Gap Clearing and Suppression of Protoplanetary Growth. *G. Bryden, Xingming Chen, D. N. C. Lin, Richard P. Nelson, & John C. B. Papaloizou.* 514, 344 (1999)

NERI, R. Detection of CO (4–3), CO (9–8), and Dust Emission in the Broad Absorption Line Quasar APM 08279+5255 at a Redshift of 3.9. *D. Downes, R. Neri, T. Wiklind, D. J. Wilner, & P. A. Shaver.* 513, L1 (1999)

NEUGEBAUER, G. High Spatial Resolution Imaging of Arp 220 from 3 to 25 Microns. *B. T. Soifer, G. Neugebauer, K. Matthews, E. E. Becklin, M. Ressler, M. W. Werner, A. J. Weinberger, & E. Egami.* 513, 207 (1999)

NEUMANN, D. See DE GRANDI, S., et al. The X-Ray Luminosity Function of Bright Galaxy Clusters in the Local Universe.

See DE GRANDI, S., et al. A Flux-limited Sample of Bright Clusters of Galaxies from the Southern Part of the *ROSAT* All-Sky Survey: The Catalog and log N–log$S$.

NEUPERT, WERNER M. Three-dimensional Stereoscopic Analysis of Solar Active Region Loops. I. *SOHO*/EIT Observations at Temperatures of (1.0–1.5) $\times 10^6$ K. *Markus J. Aschwanden, Jeffrey S. Newmark, Jean-Pierre Delaboudinière, Werner M. Neupert, J. A. Klimchuk, G. Allen Gary, Fabrice Portier-Fozzani, & Arik Zucker.* 515, 842 (1999)

NEWMAN, ALICE L. The Interaction of a Strong Magnetic Field with a Cold Plasma: The Evolution of a Magnetic Bubble. *William I. Newman & Alice L. Newman.* 515, 685 (1999)

NEWMAN, WILLIAM I. The Interaction of a Strong Magnetic Field with a Cold Plasma: The Evolution of a Magnetic Bubble. *William I. Newman & Alice L. Newman.* 515, 685 (1999)

NEWMARK, JEFFREY S. Three-dimensional Stereoscopic Analysis of Solar Active Region Loops. I. *SOHO*/EIT Observations at Temperatures of (1.0–1.5) $\times 10^6$ K. *Markus J. Aschwanden, Jeffrey S. Newmark, Jean-Pierre Delaboudinière, Werner M. Neupert, J. A. Klimchuk, G. Allen Gary, Fabrice Portier-Fozzani, & Arik Zucker.* 515, 842 (1999)

NICE, DAVID J. Radio Pulses along the Galactic Plane. *David J. Nice.* 513, 927 (1999)

NIGAM, R. Source of Solar Acoustic Modes. *R. Nigam & A. G. Kosovichev.* 514, L53 (1999)

NINDOS, A. A Study of Microwave-selected Coronal Transient Brightenings. *A. Nindos, M. R. Kundu, & S. M. White.* 513, 983 (1999)

NISHIURA, SHINGO. Optical versus Mid-Infrared Spectroscopic Classification of Ultraluminous Infrared Galaxies. *Yoshiaki Taniguchi, Akira Yoshino, Youichi Ohyama, & Shingo Nishiura.* 514, 660 (1999)

NOCI, GIANCARLO. Heating and Acceleration of the Solar Wind via Gravity Damping of Alfvén Waves. *Iolanda Cuseri, Dermott Mullan, Giancarlo Noci, & Giannina Poletto.* 514, 989 (1999)

NOGUCHI, MASAFUMI. Early Evolution of Disk Galaxies: Formation of Bulges in Clumpy Young Galactic Disks. *Masafumi Noguchi.* 514, 77 (1999)

NOMOTO, KEN'ICHI. Evolution of 3–9 $M_\odot$ Stars for z = 0.001–0.03 and Metallicity Effects on Type Ia Supernovae. *Hideyuki Umeda, Ken'ichi Nomoto, Hitoshi Yamaoka, & Shinya Wanajo.* 513, 861 (1999)

The Earliest Phases of Galaxy Evolution. *Cristina Chiappini, Francesca Matteucci, Timothy C. Beers, & Ken'ichi Nomoto.* 515, 226 (1999)

NORDLUND, Å. A Supernova-regulated Interstellar Medium: Simulations of the Turbulent Multiphase Medium. *M. J. Korpi, A. Brandenburg, A. Shukurov, I. Tuominen, & Å Nordlund.* 514, L99 (1999)

NORMANDEAU, M. Radio Polarimetric Imaging of the Interstellar Medium: Magnetic Field and Diffuse Ionized Gas Structure near the W3/W4/W5/HB 3 Complex. *A. D. Gray, T. L. Landecker, P. E. Dewdney, A. R. Taylor, A. G. Willis, & M. Normandeau.* 514, 221 (1999)

NOWAK, MICHAEL A. *Rossi X-Ray Timing Explorer* Observation of Cygnus X-1. III. Implications for Compton Corona and Advection-dominated Accretion Flow Models. *Michael A. Nowak, Jörn Wilms, Brian A. Vaughan, James B. Dove, & Mitchell C. Begelman.* 515, 726 (1999)

NYMAN, L.-Å. See ANDREANI, P., et al. The Enhancement and Decrement of the Sunyaev-Zeldovich Effect toward the *ROSAT* Cluster RX J0658−5557.

O'DEA, C. P. The Radio-Optical Jet in NGC 3862 from Parsec to Subkiloparsec Scales. *L. Lara, L. Feretti, G. Giovannini, S. Baum, W. D. Cotton, C. P. O'Dea, & T. Venturi.* 513, 197 (1999)

OEMLER, AUGUSTUS, JR. The Ultraviolet Upturn in Elliptical Galaxies as an Age Indicator. *Sukyoung Yi, Young-Wook Lee, Jong-Hak Woo, Jang-Hyun Park, Pierre Demarque, & Augustus Oemler, Jr.* 513, 128 (1999)

OFMAN, L. Slow Magnetosonic Waves in Coronal Plumes. *L. Ofman, V. M. Nakariakov, & C. E. DeForest.* 514, 441 (1999)

OGILVIE, G. I. The Effect of an Isothermal Atmosphere on the Propagation of Three-dimensional Waves in a Thermally Stratified Accretion Disk. *G. I. Ogilvie & S. H. Lubow.* 515, 767 (1999)

OHYAMA, YOUICHI. Optical versus Mid-Infrared Spectroscopic Classification of Ultraluminous Infrared Galaxies. *Yoshiaki Taniguchi, Akira Yoshino, Youichi Ohyama, & Shingo Nishiura.* 514, 660 (1999)

OKA, TOMOHARU. A High-Velocity Molecular Cloud near the Center of the Galaxy. *Tomoharu Oka, Glenn J. White, Tetsuo Hasegawa, Fumio Sato, Masato Tsuboi, & Atsushi Miyazaki.* 515, 249 (1999)

O'LINGER, JOANN. L1448 IRS 2: A HIRES-identified Class 0 Protostar. *JoAnn O'Linger, Grace Wolf-Chase, Mary Barsony, & Derek Ward-Thompson.* 515, 696 (1999)

OLINTO, ANGELA V. Cosmological Magnetic Field Limits in an Inhomogeneous Universe. *Pasquale Blasi, Scott Burles, & Angela V. Olinto.* 514, L79 (1999)

OLIVA, ERNESTO. Evolutionary Synthesis Modeling of Red Supergiant Features in the Near-Infrared. *Livia Origlia, Jeffrey D. Goldader, Claus Leitherer, Daniel Schaerer, & Ernesto Oliva.* 514, 96 (1999)

OLSZEWSKI, EDWARD W. See GALLART, CARME, et al. *Hubble Space Telescope* Observations of the Local Group Dwarf Galaxy Leo I.

ORFORD, K. J. See CHADWICK, P. M., et al. Very High Energy Gamma Rays from PKS 2155−304.

ORIGLIA, LIVIA. Evolutionary Synthesis Modeling of Red Supergiant Features in the Near-Infrared. *Livia Origlia, Jeffrey D. Goldader, Claus Leitherer, Daniel Schaerer, & Ernesto Oliva.* 514, 96 (1999)

ORLANDINI, M. A Giant Outburst from SGR 1900+14 Observed with the *BeppoSAX* Gamma-Ray Burst Monitor. *M. Feroci, F. Frontera, E. Costa, L. Amati, M. Tavani, M. Rapisarda, & M. Orlandini.* 515, L9 (1999)

OSBORNE, J. L. See CHADWICK, P. M., et al. Very High Energy Gamma Rays from PKS 2155−304.

OSTEN, RACHEL A. *Extreme Ultraviolet Explorer* Photometry of RS Canum Venaticorum Systems: Four Flaring Megaseconds. *Rachel A. Osten & Alexander Brown.* 515, 746 (1999)

OSTRIKER, EVE C. Dynamical Friction in a Gaseous Medium. *Eve C. Ostriker.* 513, 252 (1999)

Kinetic and Structural Evolution of Self-gravitating, Magnetized Clouds: 2.5-dimensional Simulations of Decaying Turbulence. *Eve C. Ostriker, Charles F. Gammie, & James M. Stone.* 513, 259 (1999)

OSTRIKER, JEREMIAH P. On the Self-consistent Response of Stellar Systems to Gravitational Shocks. *Oleg Y. Gnedin & Jeremiah P. Ostriker.* 513, 626 (1999)

Where Are the Baryons? *Renyue Cen & Jeremiah P. Ostriker.* 514, 1 (1999)

Tidal Shocking by Extended Mass Distributions. *Oleg Y. Gnedin, Lars Hernquist, & Jeremiah P. Ostriker.* 514, 109 (1999)

OTANI, C. Broadband X-Ray Observations of the Narrow-Line X-Ray Galaxy NGC 5506. *T. Wang, T. Mihara, C. Otani, M. Matsuoka, & H. Awaki.* 515, 567 (1999)

OTTE, BIRGIT. Ultracompact H II Regions with Extended Radio-Continuum Emission. *Stanley E. Kurtz, Alan M. Watson, Peter Hofner, & Birgit Otte.* 514, 232 (1999)

OWENS, A. See PIRO, L., et al. The X-Ray Afterglow of the Gamma-Ray Burst of 1997 May 8: Spectral Variability and Possible Evidence of an Iron Line.

OWOCKI, S. P. Line-driven Ablation and Wind Tilting by External Irradiation. *K. G. Gayley, S. P. Owocki, & S. R. Cranmer.* 513, 442 (1999)

PACIESAS, W. S. See VAN DER HOOFT, F., et al. Hard X-Ray Variability of the Black Hole Candidate GRO J0422+32 during Its 1992 Outburst.

PAHRE, MICHAEL A. Detection of Surface Brightness Fluctuations in NGC 4373 Using the *Hubble Space Telescope*. *Michael A. Pahre, Jeremy R. Mould, Alan Dressler, Jon A. Holtzman, Alan M. Watson, John S. Gallagher III, Gilda E. Ballester, Christopher J. Burrows, Stefano Casertano, John T. Clarke, David Crisp, Richard E. Griffiths, Carl J. Grillmair, J. Jeff Hester, John G. Hoessel, Paul A. Scowen, Karl R. Stapelfeldt, John T. Trauger, & James A. Westphal.* 515, 79 (1999)

PALLADINO, EMILIA. The Scale of Homogeneity in the Las Campanas Redshift Survey. *Luca Amendola & Emilia Palladino.* 514, L1 (1999)

PAPADOPOULOS, PADELI P. Extended Dust Emission and Atomic Hydrogen: A Reservoir of Diffuse H_2 in NGC 1068. *Padeli P. Papadopoulos & E. R. Seaquist.* 514, L95 (1999)

PAPALOIZOU, JOHN C. B. Tidally Induced Gap Formation in Protostellar Disks: Gap Clearing and Suppression of Protoplanetary Growth. *G. Bryden, Xingming Chen, D. N. C. Lin, Richard P. Nelson, & John C. B. Papaloizou.* 514, 344 (1999)

PARK, JANG-HYUN. The Ultraviolet Upturn in Elliptical Galaxies as an Age Indicator. *Sukyoung Yi, Young-Wook Lee, Jong-Hak Woo, Jang-Hyun Park, Pierre Demarque, & Augustus Oemler, Jr.* 513, 128 (1999)

PARK, MYEONG-GU. Toward the Evidence of the Accretion Disk Emission in the Symbiotic Star RR Telescopii. *Hee-Won Lee & Myeong-Gu Park.* 515, L89 (1999)

PARMAR, A. N. See PIRO, L., et al. The X-Ray Afterglow of the Gamma-Ray Burst of 1997 May 8: Spectral Variability and Possible Evidence of an Iron Line.

PASQUALI, ANNA. Multiwavelength Study of the Starburst Galaxy NGC 7714. I. Ultraviolet-Optical Spectroscopy. *Rosa M. González Delgado, María Luisa García-Vargas, Jeff Goldader, Claus Leitherer, & Anna Pasquali.* 513, 707 (1999)

PATNAIK, ALOK R. See FALCKE, HEINO, et al. A Major Radio Outburst in III Zw 2 with an Extremely Inverted, Millimeter-peaked Spectrum.

PAUBERT, GEBRIEL. Detection of the CN Zeeman Effect in Molecular Clouds. *Richard M. Crutcher, Thomas H. Troland, Bernard Lazareff, Gebriel Paubert, & Ilya Kazès.* 514, L121 (1999)

PAVLOV, GEORGE G. The Thermal X-Ray Spectra of Centaurus X-4, Aquila X-1, and 4U 1608−522 in Quiescence. *Robert E. Rutledge, Lars Bildsten, Edward F. Brown, George G. Pavlov, & Vyatcheslav E. Zavlin.* 514, 945 (1999)

PEIMBERT, M. Carbon in Spiral Galaxies from *Hubble Space Telescope* Spectroscopy. *D. R. Garnett, G. A. Shields, M. Peimbert, S. Torres-Peimbert,*

E. D. Skillman, R. J. Dufour, E. Terlevich, & R. J. Terlevich. 513, 168 (1999)

Dark Matter and the Chemical Evolution of Irregular Galaxies. *L. Carigi, P. Colín, & M. Peimbert.* 514, 787 (1999)

PENDLETON, Y. J. The Interstellar 4.62 Micron Band. *Y. J. Pendleton, A. G. G. M. Tielens, A. T. Tokunaga, & M. P. Bernstein.* 513, 294 (1999)

PENG, QIUHE. A Model for Calculating the Abundances of Neutron-Capture Elements in Metal-poor Stars. *Bo Zhang, Ji Li, Caixia Zhang, Yanchun Liang, & Qiuhe Peng.* 513, 910 (1999)

PEROLA, G. C. See PIRO, L., et al. The X-Ray Afterglow of the Gamma-Ray Burst of 1997 May 8: Spectral Variability and Possible Evidence of an Iron Line.

PESCE, JOSEPH E. *ASCA* and Contemporaneous Ground-based Observations of the BL Lacertae Objects 1749+096 and 2200+420 (BL Lac). *Rita M. Sambruna, Gabriele Ghisellini, Eric Hooper, R. I. Kollgaard, Joseph E. Pesce, & C. Megan Urry.* 515, 140 (1999)

PETERSON, SARAH. Ammonia Absorption toward the Ultracompact H II Regions G45.12+0.13 and G45.47+0.05. *Peter Hofner, Sarah Peterson, & Riccardo Cesaroni.* 514, 899 (1999)

PETRE, R. X-Ray Variability from the Compact Source in the Supernova Remnant RCW 103. *E. V. Gotthelf, R. Petre, & G. Vasisht.* 514, L107 (1999)

PETROSIAN, VAHÉ. Stochastic Acceleration of Electrons by Plasma Waves. III. Waves Propagating Perpendicular to the Magnetic Field. *Julia M. Pryadko & Vahé Petrosian.* 515, 873 (1999)

PHELPS, RANDY. See SILBERMANN, N. A., et al. The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XIV. The Cepheids in NGC 1365.

See MADORE, BARRY F., et al. The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XV. A Cepheid Distance to the Fornax Cluster and Its Implications.

PIRAINO, SANTINA. Discovery of Microsecond Soft Lags in the X-Ray Emission of the Atoll Source 4U 1636−536. *Philip Kaaret, Santina Piraino, Eric C. Ford, & Andrea Santangelo.* 514, L31 (1999)

PIRAN, TSVI. Hydrodynamics of a Relativistic Fireball: The Complete Evolution. *Shiho Kobayashi, Tsvi Piran, & Re'em Sari.* 513, 669 (1999)

Images and Spectra from the Interior of a Relativistic Fireball. *Jonathan Granot, Tsvi Piran, & Re'em Sari.* 513, 679 (1999)

PIRO, L. The X-Ray Afterglow of the Gamma-Ray Burst of 1997 May 8: Spectral Variability and Possible Evidence of an Iron Line. *L. Piro, E. Costa, M. Feroci, F. Frontera, L. Amati, D. Dal Fiume, L. A. Antonelli, J. Heise, J. in 't Zand, A. Owens, A. N. Parmar, G. Cusumano, M. Vietri, & G. C. Perola.* 514, L73 (1999)

PIZAGNO, JAMES L. On Measuring Nebular Chemical Abundances in Distant Galaxies Using Global Emission-Line Spectra. *Henry A. Kobulnicky, Robert C. Kennicutt, Jr., & James L. Pizagno.* 514, 544 (1999)

PIZZO, L. See ANDREANI, P., et al. The Enhancement and Decrement of the Sunyaev-Zeldovich Effect toward the *ROSAT* Cluster RX J0658−5557.

PLACHINDA, S. I. Precise Spectropolarimetric Measurements of Magnetic Fields on Some Solar-like Stars. *S. I. Plachinda & T. N. Tarasova.* 514, 402 (1999)

POLETTO, GIANNINA. Heating and Acceleration of the Solar Wind via Gravity Damping of Alfvén Waves. *Iolanda Cuseri, Dermott Mullan, Giancarlo Noci, & Giannina Poletto.* 514, 989 (1999)

PONS, J. A. Evolution of Proto–Neutron Stars. *J. A. Pons, S. Reddy, M. Prakash, J. M. Lattimer, & J. A. Miralles.* 513, 780 (1999)

PONS-BORDERÍA, MARÍA JESÚS. A Global Descriptor of Spatial Pattern Interaction in the Galaxy Distribution. *Martin Kerscher, María Jesús Pons-Bordería, Jens Schmalzing, Roberto Trasarti-Battistoni, Thomas Buchert, Vicent J. Martínez, & Riccardo Valdarnini.* 513, 543 (1999)

PORCIANI, CRISTIANO. How Dark Matter Halos Cluster in Lagrangian Space. *Cristiano Porciani, Paolo Catelan, & Cedric Lacey.* 513, L99 (1999)

PORTIER-FOZZANI, FABRICE. Three-dimensional Stereoscopic Analysis of Solar Active Region Loops. I. *SOHO*/EIT Observations at Temperatures of (1.0–1.5) $\times 10^6$ K. *Markus J. Aschwanden, Jeffrey S. Newmark, Jean-Pierre Delaboudinière, Werner M. Neupert, J. A. Klimchuk, G. Allen Gary, Fabrice Portier-Fozzani, & Arik Zucker.* 515, 842 (1999)

PRAKASH, M. Evolution of Proto–Neutron Stars. *J. A. Pons, S. Reddy, M. Prakash, J. M. Lattimer, & J. A. Miralles.* 513, 780 (1999)

PREMINGER, DORA G. Restoration and Photometry of Full-Disk Solar Images. *Stephen R. Walton & Dora G. Preminger.* 514, 959 (1999)

PROFFITT, CHARLES. Theoretical Oscillator Strengths and Hyperfine Structure in Hg II. *Tomas Brage, Charles Proffitt, & David S. Leckrone.* 513, 524 (1999)

PROSSER, CHARLES F. See KELSON, DANIEL D., et al. The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XIX. The Discovery of Cepheids in and a New Distance to NGC 3198.

PRYADKO, JULIA M. Stochastic Acceleration of Electrons by Plasma Waves. III. Waves Propagating Perpendicular to the Magnetic Field. *Julia M. Pryadko & Vahé Petrosian.* 515, 873 (1999)

PTI COLLABORATION, THE. See BODEN, A. F., et al. The Visual Orbit of ι Pegasi.

PUDRITZ, RALPH E. See WILSON, CHRISTINE D., et al. Submillimeter Continuum Emission in the ρ Ophiuchi Molecular Cloud: Filaments, Arcs, and an Unidentified Far-Infrared Object.

PURCELL, W. R. Gamma-Ray Emission from the Inner Galactic Ridge. *R. L. Kinzer, W. R. Purcell, & J. D. Kurfess.* 515, 215 (1999)

PUXLEY, P. J. High-Resolution Infrared Spectroscopy and Nuclear Clusters in the Starburst Galaxy NGC 1614. *P. J. Puxley & P. W. J. L. Brand.* 514, 675 (1999)

QIAN, Y. Z. Neutrino Fluence after r-Process Freezeout and Abundances of Te Isotopes in Presolar Diamonds. *Y. Z. Qian, P. Vogel, & G. J. Wasserburg.* 513, 956 (1999)

QIAO, G. J. Is Coherence Essential to Account for Pulsar Radio Emission? *Bing Zhang, B. H. Hong, & G. J. Qiao.* 514, L111 (1999)

QIU, JIONG. Extreme-Ultraviolet Jets and Hα Surges in Solar Microflares. *Jongchul Chae, Jiong Qiu, Haimin Wang, & Philip R. Goode.* 513, L75 (1999)

QUASHNOCK, JEAN M. A New Measure of the Clustering of QSO Heavy-Element Absorption-Line Systems. *Jean M. Quashnock & Michael L. Stein.* 515, 506 (1999)

QUINN, J. See KATAOKA, J., et al. High-Energy Emission from the TeV Blazar Markarian 501 during Multiwavelength Observations in 1996.

RABELLO-SOARES, MARIA CRISTINA. See CHOU, DEAN-YI, et al. Acoustic Imaging in Helioseismology.

RAHA, SIBAJI. Quark Nuggets as Baryonic Dark Matter. *Jan-e Alam, Sibaji Raha, & Bikash Sinha.* 513, 572 (1999)

RAND, RICHARD J. The Eastern Arm of M83 Revisited: High-Resolution Mapping of ^{12}CO 1–0 Emission. *Richard J. Rand, Steven D. Lord, & James L. Higdon.* 513, 720 (1999)

RAO, A. PRAMESH. Long-Term Scintillation Studies of Pulsars. II. Refractive Effects and the Spectrum of Plasma Density Fluctuations. *N. D. Ramesh Bhat, Yashwant Gupta, & A. Pramesh Rao.* 514, 249 (1999)

Long-Term Scintillation Studies of Pulsars. III. Testing Theoretical Models of Refractive Scintillation. *N. D. Ramesh Bhat, A. Pramesh Rao, & Yashwant Gupta.* 514, 272 (1999)

RAPISARDA, M. A Giant Outburst from SGR 1900+14 Observed with the *BeppoSAX* Gamma-Ray Burst Monitor. *M. Feroci, F. Frontera, E. Costa, L. Amati, M. Tavani, M. Rapisarda, & M. Orlandini.* 515, L9 (1999)

RASIO, FREDERIC A. Structure and Evolution of Nearby Stars with Planets. I. Short-Period Systems. *Eric B. Ford, Frederic A. Rasio, & Alison Sills.* 514, 411 (1999)

RATNATUNGA, KAVAN. Compact Nuclei in Galaxies at Moderate Redshift. II. Their Nature and Implications for the Active Galactic Nucleus Luminosity Function. *Vicki L. Sarajedini, Richard F. Green, Richard E. Griffiths, & Kavan Ratnatunga.* 514, 746 (1999)

RAUCH, KEVIN P. Collisional Stellar Dynamics around Massive Black Holes in Active Galactic Nuclei. *Kevin P. Rauch.* 514, 725 (1999)

RAUCH, MICHAEL. First Comparison of Ionization and Metallicity in Two Lines of Sight toward HE 1104−1805A,B at $z = 1.66$. *Sebastian Lopez, Dieter Reimers, Michael Rauch, Wallace L. W. Sargent, & Alain Smette.* 513, 598 (1999)

Small-Scale Structure at High Redshift. I. Glimpses of the Interstellar Medium at Redshift ~3.5. *Michael Rauch, Wallace L. W. Sargent, & Tom A. Barlow.* 515, 500 (1999)

RAWSON, DAYA. See SILBERMANN, N. A., et al. The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XIV. The Cepheids in NGC 1365.

RAY, A. *Rossi X-Ray Timing Explorer* Observation of PSR B1706−44 and Implications for Theoretical Models of Pulsar Emission. *A. Ray, A. K. Harding, & M. Strickman.* 513, 919 (1999)

RAYMOND, J. C. Do Jet-driven Shocks Ionize the Narrow-Line Regions of Seyfert Galaxies? *A. S. Wilson & J. C. Raymond.* 513, L115 (1999)

RAYMOND, JOHN. Thermal X-Ray Line Emission from Accreting Black Holes. *Ramesh Narayan & John Raymond.* 515, L69 (1999)

RAYMOND, JOHN C. The Far-Ultraviolet Spectrum and Short-Timescale Variability of AM Herculis from Observations with the Hopkins Ultraviolet Telescope. *Bradford W. Greeley, William P. Blair, Knox S. Long, & John C. Raymond.* 513, 491 (1999)

RAYNER, D. See HJELLMING, R. M., et al. Radio and X-Ray Observations of the 1998 Outburst of the Recurrent X-Ray Transient 4U 1630−47.

RAYNER, S. M. See CHADWICK, P. M., et al. Very High Energy Gamma Rays from PKS 2155−304.

REDDY, S. Evolution of Proto–Neutron Stars. *J. A. Pons, S. Reddy, M. Prakash, J. M. Lattimer, & J. A. Miralles.* 513, 780 (1999)

REES, MARTIN J. Radiative Transfer in a Clumpy Universe. III. The Nature of Cosmological Ionizing Sources. *Piero Madau, Francesco Haardt, & Martin J. Rees.* 514, 648 (1999)

REID, M. J. The Synchrotron Jet from the H_2O Maser Source in W3(OH). *D. J. Wilner, M. J. Reid, & Karl M. Menten.* 513, 775 (1999)

REIMERS, DIETER. First Comparison of Ionization and Metallicity in Two Lines of Sight toward HE 1104−1805A,B at $z = 1.66$. *Sebastian Lopez, Dieter Reimers, Michael Rauch, Wallace L. W. Sargent, & Alain Smette.* 513, 598 (1999)

RENZINI, ALVIO. Objects in NGC 205 Resolved into Stellar Associations by *Hubble Space Telescope* Ultraviolet Imaging. *Michele Cappellari, Francesco Bertola, David Burstein, Lucio M. Buson, Laura Greggio, & Alvio Renzini.* 515, L17 (1999)

RESSLER, M. High Spatial Resolution Imaging of Arp 220 from 3 to 25 Microns. *B. T. Soifer, G. Neugebauer, K. Matthews, E. E. Becklin, M. Ressler, M. W. Werner, A. J. Weinberger, & E. Egami.* 513, 207 (1999)

REYNOLDS, CHISTOPHER S. X-Ray Iron Line Reverberation from Black Hole Accretion Disks. *Chistopher S. Reynolds, Andrew J. Young, Mitchell C. Begelman, & Andrew C. Fabian.* 514, 164 (1999)

REYNOLDS, STEPHEN P. Radio to Gamma-Ray Emission from Shell-Type Supernova Remnants: Predictions from Nonlinear Shock Acceleration Models. *Matthew G. Baring, Donald C. Ellison, Stephen P. Reynolds, Isabelle A. Grenier, & Philippe Goret.* 513, 311 (1999)

RICHARDS, E. A. Radio Identification of Submillimeter Sources in the Hubble Deep Field. *E. A. Richards.* 513, L9 (1999)

RICHARDS, GORDON T. Determining the Fraction of Intrinsic C IV Absorption in Quasi-stellar Object Absorption-Line Systems. *Gordon T. Richards, Donald G. York, Brian Yanny, Ronald I. Kollgaard, S. A. Laurent-Muehleisen, & Daniel E. Vanden Berk.* 513, 576 (1999)

RIEKE, M. J. A Statistical Study of Rest-Frame Optical Emission Properties in Luminous Quasars at $2.0 \leq z \leq 2.5$. *D. H. McIntosh, M. J. Rieke, H.-W. Rix, C. B. Foltz, & R. J. Weymann.* 514, 40 (1999)

RIEKE, MARCIA. See SCHNEIDER, GLENN, et al. NICMOS Imaging of the HR 4796A Circumstellar Disk.

RIETMEIJER, FRANS J. M. Sodium Tails of Comets: Na/O and Na/Si Abundances in Interplanetary Dust Particles. *Frans J. M. Rietmeijer.* 514, L125 (1999)

RIMMELE, THOMAS. The Granular Magnetic Fields of the Quiet Sun. *Haosheng Lin & Thomas Rimmele.* 514, 448 (1999)

RITOSSA, CLAUDIO. On the Evolution of Stars that Form Electron-degenerate Cores Processed by Carbon Burning. V. Shell Convection Sustained by Helium Burning, Transient Neon Burning, Dredge-out, Urca Cooling, and Other Properties of an 11 $M_\odot$ Population I Model Star. *Claudio Ritossa, Enrique García-Berro, & Icko Iben, Jr.* 515, 381 (1999)

RIX, H.-W. A Statistical Study of Rest-Frame Optical Emission Properties in Luminous Quasars at $2.0 \leq z \leq 2.5$. *D. H. McIntosh, M. J. Rieke, H.-W. Rix, C. B. Foltz, & R. J. Weymann.* 514, 40 (1999)

RIX, HANS-WALTER. Large Stellar Disks in Small Elliptical Galaxies. *Hans-Walter Rix, C. Marcella Carollo, & Ken Freeman.* 513, L25 (1999)

Maximal Disks and the Tully-Fisher Relation. *Stéphane Courteau & Hans-Walter Rix.* 513, 561 (1999)

ROBERTS, D. A. The Magnetic Field of the NGC 2024 Molecular Cloud. *R. M. Crutcher, D. A. Roberts, T. H. Troland, & W. M. Goss.* 515, 275 (1999)

Detection of Magnetic Fields toward M17 through the H I Zeeman Effect. *C. L. Brogan, T. H. Troland, D. A. Roberts, & R. M. Crutcher.* 515, 304 (1999)

ROBERTS, MALLORY S. E. The "Rabbit": A Potential Radio Counterpart of GeV J1417−6100. *Mallory S. E. Roberts, Roger W. Romani, Simon Johnston, & Anne J. Green.* 515, 712 (1999)

ROBERTSON, STANLEY L. X-Ray Novae, Event Horizons, and the Exponential Metric. *Stanley L. Robertson.* 515, 365 (1999)

ROBINSON, EDWARD L. Application of Realistic Model Atmospheres to Eclipse Maps of Accretion Disks: The Effective Temperature and Flare of the Disk in the Dwarf Nova Z Chamaeleontis. *Edward L. Robinson, Janet H. Wood, & Richard A. Wade.* 514, 952 (1999)

RODRÍGUEZ, L. F. VLA Observations of the Interacting-Wind Binary System WR 147. *M. E. Contreras & L. F. Rodríguez.* 515, 762 (1999)

RODRÍGUEZ, LUIS F. Disk and Ouflow in Cepheus A–HW2: Interferometric SiO and HCO^+ Observations. *José F. Gómez, Anneila I. Sargent, José M. Torrelles, Paul T. P. Ho, Luis F. Rodríguez, Jorge Cantó, & Guido Garay.* 514, 287 (1999)

Radio Continuum and Recombination Line Observations of the Polypolar Planetary Nebula NGC 2440. *Roberto Vázquez, José M. Torrelles, Luis F. Rodríguez, Yolanda Gómez, J. Alberto López, & Luis F. Miranda.* 515, 633 (1999)

ROETTIGER, KURT. *Rossi X-Ray Timing Explorer* Hard X-Ray Observation of Abell 754: Constraining the Hottest Temperature Component and the Intracluster Magnetic Field. *Azita Valinia, Mark J. Henriksen, Michael Lowenstein, Kurt Roettiger, Richard F. Mushotzky, & Greg Madejski.* 515, 42 (1999)

ROMANI, P. N. Detection of the Methyl Radical on Neptune. *B. Bézard, P. N. Romani, H. Feuchtgruber, & T. Encrenaz.* 515, 868 (1999)

ROMANI, ROGER W. The "Rabbit": A Potential Radio Counterpart of GeV J1417−6100. *Mallory S. E. Roberts, Roger W. Romani, Simon Johnston, & Anne J. Green.* 515, 712 (1999)

ROMANOVA, M. M. Magnetic Propeller Outflows. *R. V. E. Lovelace, M. M. Romanova, & G. S. Bisnovatyi-Kogan.* 514, 368 (1999)

Hydrodynamic Simulations of Counterrotating Accretion Disks. *O. A. Kuznetsov, R. V. E. Lovelace, M. M. Romanova, & V. M. Chechetkin.* 514, 691 (1999)

ROSATI, PIERO. Detection of Evolved High-Redshift Galaxies in Deep NICMOS/VLT Images. *Narciso Benitez, Tom Broadhurst, Rychard Bouwens, Joseph Silk, & Piero Rosati.* 515, L65 (1999)

ROTH, KATHERINE C. The $z = 1.6748$ C I Absorber toward PKS 1756+237. *Katherine C. Roth & James M. Bauer.* 515, L57 (1999)

ROY, JEAN-RENÉ. Modeling the Radial Abundance Distribution of the Transition Galaxy NGC 1313. *Mercedes Mollá & Jean-René Roy.* 514, 781 (1999)

RUBENSTEIN, ERIC P. *Hubble Space Telescope* Observations of the Central-Cusp Globular Cluster NGC 6752: the Effect of Binary Stars on the Luminosity Function in the Core. *Eric P. Rubenstein & Charles D. Bailyn.* 513, L33 (1999)

RUFFOLO, D. Transport and Acceleration of Energetic Charged Particles near an Oblique Shock. *D. Ruffolo.* 515, 787 (1999)

RUPEN, M. P. See HJELLMING, R. M., et al. Radio and X-Ray Observations of the 1998 Outburst of the Recurrent X-Ray Transient 4U 1630−47.

RUTLEDGE, ROBERT E. The Thermal X-Ray Spectra of Centaurus X-4, Aquila X-1, and 4U 1608−522 in Quiescence. *Robert E. Rutledge, Lars Bildsten, Edward F. Brown, George G. Pavlov, & Vyatcheslav E. Zavlin.* 514, 945 (1999)

RUZMAIKIN, A. A. Characteristic Scales of Photospheric Flows and Their Magnetic and Temperature Markers. *J. K. Lawrence, A. C. Cadavid, & A. A. Ruzmaikin.* 513, 506 (1999)

RYU, DONGSU. A Multidimensional Code for Isothermal Magnetohydrodynamic Flows in Astrophysics. *Jongsoo Kim, Dongsu Ryu, T. W. Jones, & Seung Soo Hong.* 514, 506 (1999)

RYUTOVA, M. Heating and Jet Formation by Hydrodynamic Cumulation in the Solar Atmosphere. *T. Tarbell, M. Ryutova, J. Covington, & A. Fludra.* 514, L47 (1999)

SAHA, ABHIJIT. See KELSON, DANIEL D., et al. The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XIX. The Discovery of Cepheids in and a New Distance to NGC 3198.

See GALLART, CARME, et al. *Hubble Space Telescope* Observations of the Local Group Dwarf Galaxy Leo I.

SAHAI, RAGHVENDRA. The "Water-Fountain Nebula" IRAS 16342−3814: *Hubble Space Telescope*/Very Large Array Study of a Bipolar Protoplanetary Nebula. *Raghvendra Sahai, Peter te Lintel Hekkert, Mark Morris, Albert Zijlstra, & Lauren Likkel.* 514, L115 (1999)

SAHU, K. C. See SAVAGLIO, S., et al. The Lyα Forest of the Quasar in the Hubble Deep Field South.

SAKAI, SHOKO. See KELSON, DANIEL D., et al. The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XIX. The Discovery of Cepheids in and a New Distance to NGC 3198.

See SILBERMANN, N. A., et al. The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XIV. The Cepheids in NGC 1365.

See MADORE, BARRY F., et al. The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XV. A Cepheid Distance to the Fornax Cluster and Its Implications.

SAKAMOTO, K. Counterrotating Nuclear Disks in Arp 220. *K. Sakamoto, N. Z. Scoville, M. S. Yun, M. Crosas, R. Genzel, & L. J. Tacconi.* 514, 68 (1999)

SALARIS, MAURIZIO. Stellar Envelope Convection Calibrated by Radiation Hydrodynamics Simulations: Influence on Globular Cluster Isochrones. *Bernd Freytag & Maurizio Salaris.* 513, L49 (1999)

SALVERDA, JANTE M. Envelope Structure of Deeply Embedded Young Stellar Objects in the Serpens Molecular Cloud. *Michiel R. Hogerheijde, Ewine F. van Dishoeck, Jante M. Salverda, & Geoffrey A. Blake.* 513, 350 (1999)

SAMBRUNA, RITA M. *ASCA* and Contemporaneous Ground-based Observations of the BL Lacertae Objects 1749+096 and 2200+420 (BL Lac). *Rita M. Sambruna, Gabriele Ghisellini, Eric Hooper, R. I. Kollgaard, Joseph E. Pesce, & C. Megan Urry.* 515, 140 (1999)

SANDELL, GÖRAN. See FALCKE, HEINO, et al. A Major Radio Outburst in III Zw 2 with an Extremely Inverted, Millimeter-peaked Spectrum.

SANO, TAKAYOSHI. Magnetorotational Instability in Protoplanetary Disks. I. On the Global Stability of Weakly Ionized Disks with Ohmic Dissipation. *Takayoshi Sano & Shoken M. Miyama.* 515, 776 (1999)

SANTANGELO, ANDREA. Hard X-Ray Radiation in the Coma Cluster Spectrum. *Roberto Fusco-Femiano, Daniele Dal Fiume, Luigina Feretti, Gabriele Giovannini, Paola Grandi, Giorgio Matt, Silvano Molendi, & Andrea Santangelo.* 513, L21 (1999)

Discovery of Microsecond Soft Lags in the X-Ray Emission of the Atoll Source 4U 1636−536. *Philip Kaaret, Santina Piraino, Eric C. Ford, & Andrea Santangelo.* 514, L31 (1999)

SANTILLÁN, ALFREDO. The Collisions of High-Velocity Clouds with a Magnetized Gaseous Galactic Disk. *Alfredo Santillán, José Franco, Marco Martos, & Jongsoo Kim.* 515, 657 (1999)

SARAJEDINI, VICKI L. Compact Nuclei in Galaxies at Moderate Redshift. II. Their Nature and Implications for the Active Galactic Nucleus Luminosity Function. *Vicki L. Sarajedini, Richard F. Green, Richard E. Griffiths, & Kavan Ratnatunga.* 514, 746 (1999)

SARGENT, ANNEILA I. Disk and Ouflow in Cepheus A–HW2: Interferometric SiO and HCO^+ Observations. *José F. Gómez, Anneila I. Sargent, José M. Torrelles, Paul T. P. Ho, Luis F. Rodríguez, Jorge Cantó, & Guido Garay.* 514, 287 (1999)

SARGENT, WALLACE L. W. First Comparison of Ionization and Metallicity in Two Lines of Sight toward HE 1104−1805A,B at $z = 1.66$. *Sebastian Lopez, Dieter Reimers, Michael Rauch, Wallace L. W. Sargent, & Alain Smette.* 513, 598 (1999)

Small-Scale Structure at High Redshift. I. Glimpses of the Interstellar Medium at Redshift ∼3.5. *Michael Rauch, Wallace L. W. Sargent, & Tom A. Barlow.* 515, 500 (1999)

SARI, RE'EM. Hydrodynamics of a Relativistic Fireball: The Complete Evolution. *Shiho Kobayashi, Tsvi Piran, & Re'em Sari.* 513, 669 (1999)

Images and Spectra from the Interior of a Relativistic Fireball. *Jonathan Granot, Tsvi Piran, & Re'em Sari.* 513, 679 (1999)

SATO, FUMIO. A High-Velocity Molecular Cloud near the Center of the Galaxy. *Tomoharu Oka, Glenn J. White, Tetsuo Hasegawa, Fumio Sato, Masato Tsuboi, & Atsushi Miyazaki.* 515, 249 (1999)

SATO, SHINJI. Hot Gas Halo of NGC 3923: Circulation of Intergalactic Matter. *Shinji Sato & Yuzuru Tawara.* 514, 765 (1999)

SATO, TETSUYA. Reaction of H Atoms with Solid C_2H_4 and C_2H_6 at 13 K. *Kenzo Hiraoka, Kazuyosi Yamamoto, Yoshihide Kihara, Toshikazu Takayama, & Tetsuya Sato.* 514, 524 (1999)

SAVAGE, BLAIR D. Highly Ionized High-Velocity Clouds: Intergalactic Gas in the Local Group or Distant Gas in the Galactic Halo? *Kenneth R. Sembach, Blair D. Savage, Limin Lu, & Edward M. Murphy.* 515, 108 (1999)

SAVAGLIO, S. The Lyα Forest of the Quasar in the Hubble Deep Field South. *S. Savaglio, H. C. Ferguson, T. M. Brown, B. R. Espey, K. C. Sahu, S. A. Baum, C. M. Carollo, M. E. Kaiser, M. Stiavelli, R. E. Williams, & J. Wilson.* 515, L5 (1999)

SCALO, JOHN. Clouds as Turbulent Density Fluctuations: Implications for Pressure Confinement and Spectral Line Data Interpretation. *Javier Ballesteros-Paredes, Enrique Vázquez-Semadeni, & John Scalo.* 515, 286 (1999)

SCHAEFER, BRADLEY E. A Statistical Treatment of the Gamma-Ray Burst "No Host Galaxy" Problem. II. Energies of Standard Candle Bursts. *David L. Band, Dieter H. Hartmann, & Bradley E. Schaefer.* 514, 862 (1999)

SCHAEFFER, R. Biasing and High-Order Statistics from the Southern-Sky Redshift Survey. *C. Benoist, A. Cappi, L. N. da Costa, S. Maurogordato, F. R. Bouchet, & R. Schaeffer.* 514, 563 (1999)

SCHAERER, DANIEL. Evolutionary Synthesis Modeling of Red Supergiant Features in the Near-Infrared. *Livia Origlia, Jeffrey D. Goldader, Claus Leitherer, Daniel Schaerer, & Ernesto Oliva.* 514, 96 (1999)

SCHILD, R. A Wavelet Exploration of the Q0957+561A,B Brightness Record. *R. Schild.* 514, 598 (1999)

SCHILKE, PETER. Hot Gas and Dust in a Protostellar Cluster near W3(OH). *Friedrich Wyrowski, Peter Schilke, C. Malcolm Walmsley, & Karl M. Menten.* 514, L43 (1999)

SCHINDLER, S. See DE GRANDI, S., et al. The X-Ray Luminosity Function of Bright Galaxy Clusters in the Local Universe.

See DE GRANDI, S., et al. A Flux-limited Sample of Bright Clusters of Galaxies from the Southern Part of the *ROSAT* All-Sky Survey: The Catalog and log *N*–log*S*.

SCHLOERB, F. P. Sub–Astronomical Unit Structure of the Near-Infrared Emission from AB Aurigae. *R. Millan-Gabet, F. P. Schloerb, W. A. Traub, F. Malbet, J. P. Berger, & J. D. Bregman.* 513, L131 (1999)

SCHMALZING, JENS. A Global Descriptor of Spatial Pattern Interaction in the Galaxy Distribution. *Martin Kerscher, María Jesús Pons-Bordería, Jens Schmalzing, Roberto Trasarti-Battistoni, Thomas Buchert, Vicent J. Martínez, & Riccardo Valdarnini.* 513, 543 (1999)

SCHMIDT, GARY D. The Polarized Spectrum of APM 08279+5255. *Dean C. Hines, Gary D. Schmidt, & Paul S. Smith.* 514, L91 (1999)

SCHMITT, B. Water Ice, Silicate, and Polycyclic Aromatic Hydrocarbon Emission Features in the *Infrared Space Observatory* Spectrum of the Carbon-rich Planetary Nebula CPD −56°8032. *Martin Cohen, M. J. Barlow, R. J. Sylvester, X.-W. Liu, P. Cox, T. Lim, B. Schmitt, & A. K. Speck.* 513, L135 (1999)

SCHNEIDER, GLENN. NICMOS Imaging of the HR 4796A Circumstellar Disk. *Glenn Schneider, Bradford A. Smith, E. E. Becklin, David W. Koerner, Roland Meier, Dean C. Hines, Patrick J. Lowrance, Richard J. Terrile, Rodger I. Thompson, & Marcia Rieke.* 513, L127 (1999)

SCHUECKER, P. See DE GRANDI, S., et al. The X-Ray Luminosity Function of Bright Galaxy Clusters in the Local Universe.

See DE GRANDI, S., et al. A Flux-limited Sample of Bright Clusters of Galaxies from the Southern Part of the *ROSAT* All-Sky Survey: The Catalog and log *N*–log*S*.

SCOTT, D. MATTHEW. *Rossi X-Ray Timing Explorer* Observations of the Anomalous Pulsar 4U 0142+61. *Colleen A. Wilson, Stefan Dieters, Mark H. Finger, D. Matthew Scott, & Jan van Paradijs.* 513, 464 (1999)

SCOTT, GRAHAM B. I. New H and H_2 Reactioas with Small Hydrocarbon Ions and Their Roles in Benzene Synthesis in Dense Interstellar Clouds. *Murray J. McEwan, Graham B. I. Scott, Nigel G. Adams, Lucia M. Babcock, R. Terzieva, & Eric Herbst.* 513, 287 (1999)

SCOVILLE, N. Z. Counterrotating Nuclear Disks in Arp 220. *K. Sakamoto, N. Z. Scoville, M. S. Yun, M. Crosas, R. Genzel, & L. J. Tacconi.* 514, 68 (1999)

See FRAYER, D. T., et al. Molecular Gas in the $z = 2.565$ Submillimeter Galaxy SMM J14011+0252.

SCOWEN, PAUL A. See PAHRE, MICHAEL A., et al. Detection of Surface Brightness Fluctuations in NGC 4373 Using the *Hubble Space Telescope*.

See KRIST, JOHN E., et al. *Hubble Space Telescope* WFPC2 Imaging of XZ Tauri: Time Evolution of a Herbig-Haro Bow Shock.

SEAQUIST, E. R. Extended Dust Emission and Atomic Hydrogen: A Reservoir of Diffuse H_2 in NGC 1068. *Padeli P. Papadopoulos & E. R. Seaquist.* 514, L95 (1999)

SELLWOOD, J. A. Warped Galaxies from Misaligned Angular Momenta. *Victor P. Debattista & J. A. Sellwood.* 513, L107 (1999)

SEMBACH, KENNETH R. Evolutionary Status of Dwarf "Transition" Galaxies. *Patricia M. Knezek, Kenneth R. Sembach, & John S. Gallagher III.* 514, 119 (1999)

Highly Ionized High-Velocity Clouds: Intergalactic Gas in the Local Group or Distant Gas in the Galactic Halo? *Kenneth R. Sembach, Blair D. Savage, Limin Lu, & Edward M. Murphy.* 515, 108 (1999)

The Distance to the Vela Supernova Remnant. *Alexandra N. Cha, Kenneth R. Sembach, & Anthony C. Danks.* 515, L25 (1999)

SHAFFER, DAVID B. CTD 93 and the Nature of Gigahertz-peaked Spectrum Radio Sources. *David B. Shaffer, K. I. Kellermann, & T. J. Cornwell.* 515, 558 (1999)

SHANG, ZHAOHUI. The PG X-Ray QSO Sample: Links between the Ultraviolet–X-Ray Continuum and Emission Lines. *Beverley J. Wills, A. Laor, M. S. Brotherton, D. Wills, B. J. Wilkes, G. J. Ferland, & Zhaohui Shang.* 515, L53 (1999)

SHAO, M. See BODEN, A. F., et al. The Visual Orbit of ι Pegasi.

SHAVER, P. See ANDREANI, P., et al. The Enhancement and Decrement of the Sunyaev-Zeldovich Effect toward the *ROSAT* Cluster RX J0658−5557.

SHAVER, P. A. Detection of CO (4–3), CO (9–8), and Dust Emission in the Broad Absorption Line Quasar APM 08279+5255 at a Redshift of 3.9. *D. Downes, R. Neri, T. Wiklind, D. J. Wilner, & P. A. Shaver.* 513, L1 (1999)

SHAW, S. E. See CHADWICK, P. M., et al. Very High Energy Gamma Rays from PKS 2155−304.

SHELTON, IAN. The RR Lyrae Period-Amplitude Relation as a Clue to the Origin of the Oosterhoff Dichotomy. *Christine M. Clement & Ian Shelton.* 515, L85 (1999)

SHIBATA, KAZUNARI. Evolution of Eruptive Flares. II. The Occurrence of Locally Enhanced Resistivity. *Tetsuya Magara & Kazunari Shibata.* 514, 456 (1999)

Alfvén Wave Model of Spicules and Coronal Heating. *Takahiro Kudoh & Kazunari Shibata.* 514, 493 (1999)

SHIELDS, G. A. Carbon in Spiral Galaxies from *Hubble Space Telescope* Spectroscopy. *D. R. Garnett, G. A. Shields, M. Peimbert, S. Torres-Peimbert, E. D. Skillman, R. J. Dufour, E. Terlevich, & R. J. Terlevich.* 513, 168 (1999)

SHIOYA, YASUHIRO. Stellar Populations in Gas-rich Galaxy Mergers. II. Feedback Effects of Type Ia and Type II Supernovae. *Kenji Bekki & Yasuhiro Shioya.* 513, 108 (1999)

Formation of Quasar Nuclei in the Hearts of Ultraluminous Infrared Galaxies. *Yoshiaki Taniguchi, Satoru Ikeuchi, & Yasuhiro Shioya.* 514, L9 (1999)

SHIU, WEI-CHENG. See CHOU, DEAN-YI, et al. Acoustic Imaging in Helioseismology.

SHRADER, C. R. A Gamma-Ray Flare from PKS 2255−282. *D. J. Macomb, N. Gehrels, & C. R. Shrader.* 513, 652 (1999)

SHUKUROV, A. A Supernova-regulated Interstellar Medium: Simulations of the Turbulent Multiphase Medium. *M. J. Korpi, A. Brandenburg, A. Shukurov, I. Tuominen, & Å Nordlund.* 514, L99 (1999)

SIDHER, SUNIL D. *Infrared Space Observatory*–Long Wavelength Spectrometer Detection of the 112 Micron HD $J = 1 \rightarrow 0$ Line toward the Orion Bar. *Christopher M. Wright, Ewine F. van Dishoeck, Pierre Cox, Sunil D. Sidher, & Martin F. Kessler.* 515, L29 (1999)

SIEWERT, C. E. A Discrete-Ordinates Solution for a Polarization Model with Complete Frequency Redistribution. *L. B. Barichello & C. E. Siewert.* 513, 370 (1999)

SILBERMANN, N. See MADORE, BARRY F., et al. The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XV. A Cepheid Distance to the Fornax Cluster and Its Implications.

SILBERMANN, N. A. See KELSON, DANIEL D., et al. The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XIX. The Discovery of Cepheids in and a New Distance to NGC 3198.

The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XIV. The Cepheids in NGC 1365. *N. A. Silbermann, Paul Harding, Laura Ferrarese, Peter B. Stetson, Barry F. Madore, Robert C Kennicutt, Jr., Wendy L. Freedman, Jeremy R. Mould, Fabio Bresolin, Holland Ford, Brad K. Gibson, John A. Graham, Mingsheng Han, John G. Hoessel, Robert J. Hill, John Huchra, Shaun M. G. Hughes, Garth D. Illingworth, Dan Kelson, Lucas Macri, Randy Phelps, Daya Rawson, Shoko Sakai, & Anne Turner.* 515, 1 (1999)

SILK, JOSEPH. Detection of Evolved High-Redshift Galaxies in Deep NICMOS/VLT Images. *Narciso Benitez, Tom Broadhurst, Rychard Bouwens, Joseph Silk, & Piero Rosati.* 515, L65 (1999)

SILLS, ALISON. The Distribution of Collisionally Induced Blue Stragglers in the Color-Magnitude Diagram. *Alison Sills & Charles D. Bailyn.* 513, 428 (1999)

Structure and Evolution of Nearby Stars with Planets. I. Short-Period Systems. *Eric B. Ford, Frederic A. Rasio, & Alison Sills.* 514, 411 (1999)

SINHA, BIKASH. Quark Nuggets as Baryonic Dark Matter. *Jan-e Alam, Sibaji Raha, & Bikash Sinha.* 513, 572 (1999)

SKILLMAN, E. D. Carbon in Spiral Galaxies from *Hubble Space Telescope* Spectroscopy. *D. R. Garnett, G. A. Shields, M. Peimbert, S. Torres-Peimbert, E. D. Skillman, R. J. Dufour, E. Terlevich, & R. J. Terlevich.* 513, 168 (1999)

SKILLMAN, EVAN D. Improving Predictions for Helium Emission Lines. *Robert A. Benjamin, Evan D. Skillman, & Derck P. Smits.* 514, 307 (1999)

SKJÆRAASEN, OLAF. Origin of the Transient, Unpulsed Radio Emission from the PSR B1259−63 Binary System. *Lewis Ball, Andrew Melatos, Simon Johnston, & Olaf Skjæraasen.* 514, L39 (1999)

SLOAN, G. C. Direct Spectroscopic Evidence for Ionized Polycyclic Aromatic Hydrocarbons in the Interstellar Medium. *G. C. Sloan, T. L. Hayward, L. J. Allamandola, J. D. Bregman, B. DeVito, & D. M. Hudgins.* 513, L65 (1999)

SMAIL, IAN. See FRAYER, D. T., et al. Molecular Gas in the $z = 2.565$ Submillimeter Galaxy SMM J14011+0252.

SMETTE, ALAIN. First Comparison of Ionization and Metallicity in Two Lines of Sight toward HE 1104−1805A,B at $z = 1.66$. *Sebastian Lopez, Dieter Reimers, Michael Rauch, Wallace L. W. Sargent, & Alain Smette.* 513, 598 (1999)

SMITH, BRADFORD A. See SCHNEIDER, GLENN, et al. NICMOS Imaging of the HR 4796A Circumstellar Disk.

SMITH, PAUL S. The Polarized Spectrum of APM 08279+5255. *Dean C. Hines, Gary D. Schmidt, & Paul S. Smith.* 514, L91 (1999)

SMITH, R. CHRIS. Supernova Remnants in the Magellanic Clouds. II. Supernova Remnant Breakouts from N11L and N86. *Rosa Murphy Williams, You-Hua Chu, John R. Dickel, R. Chris Smith, Douglas K. Milne, & P. Frank Winkler.* 514, 798 (1999)

SMITS, DERCK P. Improving Predictions for Helium Emission Lines. *Robert A. Benjamin, Evan D. Skillman, & Derck P. Smits.* 514, 307 (1999)

SOIFER, B. T. High Spatial Resolution Imaging of Arp 220 from 3 to 25 Microns. *B. T. Soifer, G. Neugebauer, K. Matthews, E. E. Becklin, M. Ressler, M. W. Werner, A. J. Weinberger, & E. Egami.* 513, 207 (1999)

SOOD, R. See HJELLMING, R. M., et al. Radio and X-Ray Observations of the 1998 Outburst of the Recurrent X-Ray Transient 4U 1630−47.

SPAANS, MARCO. The Molecular ISM in Low Surface Brightness Disk Galaxies. *J. Christopher Mihos, Marco Spaans, & Stacy S. McGaugh.* 515, 89 (1999)

Far-Infrared and Submillimeter Observations and Physical Models of the Reflection Nebula Cederblad 201. *Ciska Kemper, Marco Spaans, David J. Jansen, Michiel R. Hogerheijde, Ewine F. van Dishoeck, & Alexander G. G. M. Tielens.* 515, 649 (1999)

SPARKS, WILLIAM B. The Globular Cluster System in the Inner Region of M87. *Arunav Kundu, Bradley C. Whitmore, William B. Sparks, F. Duccio Macchetto, Stephen E. Zepf, & Keith M. Ashman.* 513, 733 (1999)

SPECK, A. K. The SiC Problem: Astronomical and Meteoritic Evidence. *A. K. Speck, A. M. Hofmeister, & M. J. Barlow.* 513, L87 (1999)

Water Ice, Silicate, and Polycyclic Aromatic Hydrocarbon Emission Features in the *Infrared Space Observatory* Spectrum of the Carbon-rich Planetary Nebula CPD −56°8032. *Martin Cohen, M. J. Barlow, R. J. Sylvester, X.-W. Liu, P. Cox, T. Lim, B. Schmitt, & A. K. Speck.* 513, L135 (1999)

SPERGEL, DAVID N. High-Velocity Clouds: Building Blocks of the Local Group. *Leo Blitz, David N. Spergel, Peter J. Teuben, Dap Hartmann, & W. Butler Burton.* 514, 818 (1999)

SREEKUMAR, P. See KATAOKA, J., et al. High-Energy Emission from the TeV Blazar Markarian 501 during Multiwavelength Observations in 1996.

STADEL, JOACHIM. Substructure in Dark Halos: Orbital Eccentricities and Dynamical Friction. *Frank C. van den Bosch, Geraint F. Lewis, George Lake, & Joachim Stadel.* 515, 50 (1999)

STANFORD, S. A. Discovery of a Radio-loud/Radio-quiet Binary Quasar. *M. S. Brotherton, Michael D. Gregg, R. H. Becker, S. A. Laurent-Muehleisen, R. L. White, & S. A. Stanford.* 514, L61 (1999)

STAPELFELDT, KARL R. See PAHRE, MICHAEL A., et al. Detection of Surface Brightness Fluctuations in NGC 4373 Using the *Hubble Space Telescope*.

See KRIST, JOHN E., et al. *Hubble Space Telescope* WFPC2 Imaging of XZ Tauri: Time Evolution of a Herbig-Haro Bow Shock.

STEIMAN-CAMERON, THOMAS Y. V2301 Ophiuchi: An X-Ray–bright Eclipsing AM Herculis Object. *Thomas Y. Steiman-Cameron & James N. Imamura.* 515, 404 (1999)

STEIN, MICHAEL L. A New Measure of the Clustering of QSO Heavy-Element Absorption-Line Systems. *Jean M. Quashnock & Michael L. Stein.* 515, 506 (1999)

STEINMETZ, MATTHIAS. The Cosmological Origin of the Tully-Fisher Relation. *Matthias Steinmetz & Julio F. Navarro.* 513, 555 (1999)

STELLA, LUIGI. Relativistic Precession around Rotating Neutron Stars: Effects Due to Frame Dragging and Stellar Oblateness. *Sharon M. Morsink & Luigi Stella.* 513, 827 (1999)

STEPHENS, DENISE. Reflected Spectra and Albedos of Extrasolar Giant Planets. I. Clear and Cloudy Atmospheres. *Mark S. Marley, Christopher Gelino, Denise Stephens, Jonathan I. Lunine, & Richard Freedman.* 513, 879 (1999)

STETSON, PETER. See MADORE, BARRY F., et al. The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XV. A Cepheid Distance to the Fornax Cluster and Its Implications.

STETSON, PETER B. See KELSON, DANIEL D., et al. The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XIX. The Discovery of Cepheids in and a New Distance to NGC 3198.

See GALLART, CARME, et al. *Hubble Space Telescope* Observations of the Local Group Dwarf Galaxy Leo I.

See SILBERMANN, N. A., et al. The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XIV. The Cepheids in NGC 1365.

STIAVELLI, M. See SAVAGLIO, S., et al. The Lyα Forest of the Quasar in the Hubble Deep Field South.

STIBBE, DARIAN T. Rates for the Electron Impact Dissociation of Molecular Hydrogen. *Darian T. Stibbe & Jonathan Tennyson.* 513, L147 (1999)

STÖRZER, H. Photodissociation Region Models of Photoevaporating Circumstellar Disks and Application to the Proplyds in Orion. *H. Störzer & D. Hollenbach.* 515, 669 (1999)

STONE, JAMES M. Kinetic and Structural Evolution of Self-gravitating, Magnetized Clouds: 2.5-dimensional Simulations of Decaying Turbulence. *Eve C. Ostriker, Charles F. Gammie, & James M. Stone.* 513, 259 (1999)

STOTHERS, RICHARD B. Rotational Effects on the Dynamical Instability of Luminous Blue Variables. *Richard B. Stothers.* 513, 460 (1999)

STRICKMAN, M. *Rossi X-Ray Timing Explorer* Observation of PSR B1706−44 and Implications for Theoretical Models of Pulsar Emission. *A. Ray, A. K. Harding, & M. Strickman.* 513, 919 (1999)

SU, KATE Y. L. Subarcsecond Optical Imaging of Proto–Planetary Nebulae. *Bruce J. Hrivnak, Philip P. Langill, Kate Y. L. Su, & Sun Kwok.* 513, 421 (1999)

SUN, MING-TSUNG. See CHOU, DEAN-YI, et al. Acoustic Imaging in Helioseismology.

SUNTZEFF, NICHOLAS B. See GALLART, CARME, et al. *Hubble Space Telescope* Observations of the Local Group Dwarf Galaxy Leo I.

SURPI, GABRIELA C. Weak Lensing by Large-Scale Structure and the Polarization Properties of Distant Radio Sources. *Gabriela C. Surpi & Diego D. Harari.* 515, 455 (1999)

SUTO, YASUSHI. Reconstructing the Radial Profiles of Gas Density and Temperature in Clusters of Galaxies from High-Resolution X-Ray and Radio Observations. *Kohji Yoshikawa & Yasushi Suto.* 513, 549 (1999)

SWANK, JEAN H. Variable-Frequency Quasi-periodic Oscillations from the Galactic Microquasar GRS 1915+105. *Craig B. Markwardt, Jean H. Swank, & Ronald E. Taam.* 513, L37 (1999)

SYLOS LABINI, F. Fractal Correlations in the CfA2–South Redshift Survey. *M. Joyce, M. Montuori, & F. Sylos Labini.* 514, L5 (1999)

SYLVESTER, R. J. Water Ice, Silicate, and Polycyclic Aromatic Hydrocarbon Emission Features in the *Infrared Space Observatory* Spectrum of the Carbon-rich Planetary Nebula CPD −56°8032. *Martin Cohen, M. J. Barlow, R. J. Sylvester, X.-W. Liu, P. Cox, T. Lim, B. Schmitt, & A. K. Speck.* 513, L135 (1999)

SZALAY, ALEXANDER S. Cumulant Correlators from the APM. *István Szapudi & Alexander S. Szalay.* 515, L43 (1999) (Orig. paper in 481, L1 (1997))

SZAPUDI, ISTVÁN. Cumulant Correlators from the APM. *István Szapudi & Alexander S. Szalay.* 515, L43 (1999) (Orig. paper in 481, L1 (1997))

SZKODY, PAULA. *Hubble Space Telescope* Fine Guidance Sensor Astrometric Parallaxes for Three Dwarf Novae: SS Aurigae, SS Cygni, and U Geminorum. *Thomas E. Harrison, Bernard J. McNamara, Paula Szkody, Barbara E. McArthur, G. F. Benedict, Arnold R. Klemola, & Ronald L. Gilliland.* 515, L93 (1999)

TAAM, RONALD E. Variable-Frequency Quasi-periodic Oscillations from the Galactic Microquasar GRS 1915+105. *Craig B. Markwardt, Jean H. Swank, & Ronald E. Taam.* 513, L37 (1999)

TACCONI, L. J. Counterrotating Nuclear Disks in Arp 220. *K. Sakamoto, N. Z. Scoville, M. S. Yun, M. Crosas, R. Genzel, & L. J. Tacconi.* 514, 68 (1999)

TAGLIAFERRI, GIANPIERO. The Active Corona of HD 35850 (F8 V). *Marc Gagné, Jeff A. Valenti, Jeffrey L. Linsky, Gianpiero Tagliaferri, Stefano Covino, & Manuel Güdel.* 515, 423 (1999)

TAJIMA, TOSHIKI. Dynamics of Plasma Close to the Horizon of a Schwarzschild Black Hole. *Wenchien Chou & Toshiki Tajima.* 513, 401 (1999)

TAKAHASHI, T. See KATAOKA, J., et al. High-Energy Emission from the TeV Blazar Markarian 501 during Multiwavelength Observations in 1996.

TAKAYAMA, TOSHIKAZU. Reaction of H Atoms with Solid C_2H_4 and C_2H_6 at 13 K. *Kenzo Hiraoka, Kazuyosi Yamamoto, Yoshihide Kihara, Toshikazu Takayama, & Tetsuya Sato.* 514, 524 (1999)

TAMAZIAN, V. S. Spectral, Photometric, and Polarimetric Study of Visual Binary COU 14. *V. S. Tamazian, J. A. Docobo, & N. D. Melikian.* 513, 933 (1999)

TANAKA, Y. See ANDREANI, P., et al. The Enhancement and Decrement of the Sunyaev-Zeldovich Effect toward the *ROSAT* Cluster RX J0658−5557.

TANG, HENG-TAI. See CHOU, DEAN-YI, et al. Acoustic Imaging in Helioseismology.

TANG, Y. H. Simulation of Magnetic Reconnection with Heat Conduction. *P. F. Chen, C. Fang, Y. H. Tang, & M. D. Ding.* 513, 516 (1999)

TANIGUCHI, YOSHIAKI. Formation of Quasar Nuclei in the Hearts of Ultraluminous Infrared Galaxies. *Yoshiaki Taniguchi, Satoru Ikeuchi, & Yasuhiro Shioya.* 514, L9 (1999)

Optical versus Mid-Infrared Spectroscopic Classification of Ultraluminous Infrared Galaxies. *Yoshiaki Taniguchi, Akira Yoshino, Youichi Ohyama, & Shingo Nishiura.* 514, 660 (1999)

TARASOVA, T. N. Precise Spectropolarimetric Measurements of Magnetic Fields on Some Solar-like Stars. *S. I. Plachinda & T. N. Tarasova.* 514, 402 (1999)

TARBELL, T. Heating and Jet Formation by Hydrodynamic Cumulation in the Solar Atmosphere. *T. Tarbell, M. Ryutova, J. Covington, & A. Fludra.* 514, L47 (1999)

TAVANI, M. A Giant Outburst from SGR 1900+14 Observed with the *BeppoSAX* Gamma-Ray Burst Monitor. *M. Feroci, F. Frontera, E. Costa, L. Amati, M. Tavani, M. Rapisarda, & M. Orlandini.* 515, L9 (1999)

TAWARA, YUZURU. Hot Gas Halo of NGC 3923: Circulation of Intergalactic Matter. *Shinji Sato & Yuzuru Tawara.* 514, 765 (1999)

TAYLOR, A. R. JCMT Observations of Cometary Clouds in the Galactic Chimney near W4. *A. R. Taylor, Judith A. Irwin, Henry E. Matthews, & Mark H. Heyer.* 513, 339 (1999)

Radio Polarimetric Imaging of the Interstellar Medium: Magnetic Field and Diffuse Ionized Gas Structure near the W3/W4/W5/HB 3 Complex. *A. D. Gray, T. L. Landecker, P. E. Dewdney, A. R. Taylor, A. G. Willis, & M. Normandeau.* 514, 221 (1999)

TEGMARK, MAX. Weak Lensing: Prospects for Measuring Cosmological Parameters. *Wayne Hu & Max Tegmark.* 514, L65 (1999)

Cosmological Constraints from Current Cosmic Microwave Background and Type Ia Supernova Data: A Brute Force, Eight-Parameter Analysis. *Max Tegmark.* 514, L69 (1999)

TE LINTEL HEKKERT, PETER. The "Water-Fountain Nebula" IRAS 16342−3814: *Hubble Space Telescope*/Very Large Array Study of a Bipolar Protoplanetary Nebula. *Raghvendra Sahai, Peter te Lintel Hekkert, Mark Morris, Albert Zijlstra, & Lauren Likkel.* 514, L115 (1999)

TENNYSON, JONATHAN. Rates for the Electron Impact Dissociation of Molecular Hydrogen. *Darian T. Stibbe & Jonathan Tennyson.* 513, L147 (1999)

TEPLITZ, HARRY I. A Narrowband Imaging Search for [O III] Emission from Galaxies at $z > 3$. *Harry I. Teplitz, Matthew A. Malkan, & Ian S. McLean.* 514, 33 (1999)

TERÄSRANTA, HARRI. See FALCKE, HEINO, et al. A Major Radio Outburst in III Zw 2 with an Extremely Inverted, Millimeter-peaked Spectrum.

TERLEVICH, E. Carbon in Spiral Galaxies from *Hubble Space Telescope* Spectroscopy. *D. R. Garnett, G. A. Shields, M. Peimbert, S. Torres-Peimbert, E. D. Skillman, R. J. Dufour, E. Terlevich, & R. J. Terlevich.* 513, 168 (1999)

TERLEVICH, R. J. Carbon in Spiral Galaxies from *Hubble Space Telescope* Spectroscopy. *D. R. Garnett, G. A. Shields, M. Peimbert, S. Torres-Peimbert, E. D. Skillman, R. J. Dufour, E. Terlevich, & R. J. Terlevich.* 513, 168 (1999)

TERRILE, RICHARD J. See SCHNEIDER, GLENN, et al. NICMOS Imaging of the HR 4796A Circumstellar Disk.

TERZIEVA, R. New H and H_2 Reactions with Small Hydrocarbon Ions and Their Roles in Benzene Synthesis in Dense Interstellar Clouds. *Murray J. McEwan, Graham B. I. Scott, Nigel G. Adams, Lucia M. Babcock, R. Terzieva, & Eric Herbst.* 513, 287 (1999)

TEUBEN, PETER J. High-Velocity Clouds: Building Blocks of the Local Group. *Leo Blitz, David N. Spergel, Peter J. Teuben, Dap Hartmann, & W. Butler Burton.* 514, 818 (1999)

THADDEUS, P. Laboratory Detection of the Ring-Chain Carbenes HC_4N and HC_6N. *M. C. McCarthy, J.-U. Grabow, M. J. Travers, W. Chen, C. A. Gottlieb, & P. Thaddeus.* 513, 305 (1999)

THOMPSON, IAN B. See GALLART, CARME, et al. *Hubble Space Telescope* Observations of the Local Group Dwarf Galaxy Leo I.

THOMPSON, KEITH L. Lack of Iron Abundance Evolution in High-Redshift QSOs. *Keith L. Thompson, Gary J. Hill, & Richard Elston.* 515, 487 (1999)

THOMPSON, RODGER I. See SCHNEIDER, GLENN, et al. NICMOS Imaging of the HR 4796A Circumstellar Disk.

TIELENS, A. G. G. M. The Interstellar 4.62 Micron Band. *Y. J. Pendleton, A. G. G. M. Tielens, A. T. Tokunaga, & M. P. Bernstein.* 513, 294 (1999)

TIELENS, ALEXANDER G. G. M. Far-Infrared and Submillimeter Observations and Physical Models of the Reflection Nebula Cederblad 201. *Ciska Kemper, Marco Spaans, David J. Jansen, Michiel R. Hogerheijde, Ewine F. van Dishoeck, & Alexander G. G. M. Tielens.* 515, 649 (1999)

TOKUNAGA, A. T. The Interstellar 4.62 Micron Band. *Y. J. Pendleton, A. G. G. M. Tielens, A. T. Tokunaga, & M. P. Bernstein.* 513, 294 (1999)

TONRY, JOHN L. Velocity Dispersion of the Gravitational Lens 0957+561. *John L. Tonry & Marijn Franx.* 515, 512 (1999)

TORRELLES, JOSÉ M. Disk and Ouflow in Cepheus A–HW2: Interferometric SiO and HCO^+ Observations. *José F. Gómez, Anneila I. Sargent, José M. Torrelles, Paul T. P. Ho, Luis F. Rodríguez, Jorge Cantó, & Guido Garay.* 514, 287 (1999)

Radio Continuum and Recombination Line Observations of the Polypolar Planetary Nebula NGC 2440. *Roberto Vázquez, José M. Torrelles, Luis F. Rodríguez, Yolanda Gómez, J. Alberto López, & Luis F. Miranda.* 515, 633 (1999)

TORRES-PEIMBERT, S. Carbon in Spiral Galaxies from *Hubble Space Telescope* Spectroscopy. *D. R. Garnett, G. A. Shields, M. Peimbert, S. Torres-Peimbert, E. D. Skillman, R. J. Dufour, E. Terlevich, & R. J. Terlevich.* 513, 168 (1999)

TRASARTI-BATTISTONI, ROBERTO. A Global Descriptor of Spatial Pattern Interaction in the Galaxy Distribution. *Martin Kerscher, María Jesús Pons-Bordería, Jens Schmalzing, Roberto Trasarti-Battistoni, Thomas Buchert, Vicent J. Martínez, & Riccardo Valdarnini.* 513, 543 (1999)

TRAUB, W. A. Sub–Astronomical Unit Structure of the Near-Infrared Emission from AB Aurigae. *R. Millan-Gabet, F. P. Schloerb, W. A. Traub, F. Malbet, J. P. Berger, & J. D. Bregman.* 513, L131 (1999)

TRAUGER, JOHN T. See PAHRE, MICHAEL A., et al. Detection of Surface Brightness Fluctuations in NGC 4373 Using the *Hubble Space Telescope*.

See KRIST, JOHN E., et al. *Hubble Space Telescope* WFPC2 Imaging of XZ Tauri: Time Evolution of a Herbig-Haro Bow Shock.

TRAVERS, M. J. Laboratory Detection of the Ring-Chain Carbenes HC_4N and HC_6N. *M. C. McCarthy, J.-U. Grabow, M. J. Travers, W. Chen, C. A. Gottlieb, & P. Thaddeus.* 513, 305 (1999)

TROLAND, T. H. The Magnetic Field of the NGC 2024 Molecular Cloud. *R. M. Crutcher, D. A. Roberts, T. H. Troland, & W. M. Goss.* 515, 275 (1999)

Detection of Magnetic Fields toward M17 through the H I Zeeman Effect. *C. L. Brogan, T. H. Troland, D. A. Roberts, & R. M. Crutcher.* 515, 304 (1999)

TROLAND, THOMAS H. Detection of the CN Zeeman Effect in Molecular Clouds. *Richard M. Crutcher, Thomas H. Troland, Bernard Lazareff, Gebriel Paubert, & Ilya Kazès.* 514, L121 (1999)

TSUBOI, MASATO. A High-Velocity Molecular Cloud near the Center of the Galaxy. *Tomoharu Oka, Glenn J. White, Tetsuo Hasegawa, Fumio Sato, Masato Tsuboi, & Atsushi Miyazaki.* 515, 249 (1999)

TSVETANOV, ZLATAN I. The Color Distributions of Globular Clusters in Virgo Elliptical Galaxies. *Eric H. Neilsen, Jr., & Zlatan I. Tsvetanov.* 515, L13 (1999)

TUCHMAN, Y. On the Pulsation Mode of Mira Variables: Nonlinear Calculations Compared with Radius Observations. *A. Ya'ari & Y. Tuchman.* 514, L35 (1999)

TUOMINEN, I. A Supernova-regulated Interstellar Medium: Simulations of the Turbulent Multiphase Medium. *M. J. Korpi, A. Brandenburg, A. Shukurov, I. Tuominen, & Å Nordlund.* 514, L99 (1999)

TURNER, ANNE. See SILBERMANN, N. A., et al. The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XIV. The Cepheids in NGC 1365.

TURNSHEK, DAVID A. *Hubble Space Telescope* Observations of the Gravitationally Lensed Cloverleaf Broad Absorption Line QSO H1413+1143: Modeling the Lens. *Kyu-Hyun Chae & David A. Turnshek.* 514, 587 (1999)

TURVER, K. E. See CHADWICK, P. M., et al. Very High Energy Gamma Rays from PKS 2155−304.

TZIOUMIS, A. See HJELLMING, R. M., et al. Radio and X-Ray Observations of the 1998 Outburst of the Recurrent X-Ray Transient 4U 1630−47.

UBERTINI, P. Bursts from GS 1826−238: A Clocked Thermonuclear Flashes Generator. *P. Ubertini, A. Bazzano, M. Cocchi, L. Natalucci, J. Heise, J. M. Muller, & J. J. M. in 't Zand.* 514, L27 (1999)

ULLA, ANA. *Infrared Space Observatory* Observations of IRAS 16594−4656: A New Proto–Planetary Nebula with a Strong 21 Micron Dust Feature. *Pedro García-Lario, Arturo Manchado, Ana Ulla, & Minia Manteiga.* 513, 941 (1999)

ULMER, ANDREW. Flares from the Tidal Disruption of Stars by Massive Black Holes. *Andrew Ulmer.* 514, 180 (1999)

UMEDA, HIDEYUKI. Evolution of 3–9 $M_\odot$ Stars for z = 0.001–0.03 and Metallicity Effects on Type Ia Supernovae. *Hideyuki Umeda, Ken'ichi Nomoto, Hitoshi Yamaoka, & Shinya Wanajo.* 513, 861 (1999)

UMEMURA, MASAYUKI. On the Mass of Population III Stars. *Fumitaka Nakamura & Masayuki Umemura.* 515, 239 (1999)

URRY, C. MEGAN. *ASCA* and Contemporaneous Ground-based Observations of the BL Lacertae Objects 1749+096 and 2200+420 (BL Lac). *Rita M. Sambruna, Gabriele Ghisellini, Eric Hooper, R. I. Kollgaard, Joseph E. Pesce, & C. Megan Urry.* 515, 140 (1999)

VALDARNINI, RICCARDO. A Global Descriptor of Spatial Pattern Interaction in the Galaxy Distribution. *Martin Kerscher, María Jesús Pons-Bordería, Jens Schmalzing, Roberto Trasarti-Battistoni, Thomas Buchert, Vicent J. Martínez, & Riccardo Valdarnini.* 513, 543 (1999)

VALENTI, JEFF A. The Active Corona of HD 35850 (F8 V). *Marc Gagné, Jeff A. Valenti, Jeffrey L. Linsky, Gianpiero Tagliaferri, Stefano Covino, & Manuel Güdel.* 515, 423 (1999)

VALINIA, AZITA. *Rossi X-Ray Timing Explorer* Hard X-Ray Observation of Abell 754: Constraining the Hottest Temperature Component and the Intracluster Magnetic Field. *Azita Valinia, Mark J. Henriksen, Michael Lowenstein, Kurt Roettiger, Richard F. Mushotzky, & Greg Madejski.* 515, 42 (1999)

VALOTTO, CARLOS A. Quasar-Galaxy and AGN-Galaxy Cross-Correlations. *Héctor J. Martínez, Manuel E. Merchán, Carlos A. Valotto, & Diego G. Lambas.* 514, 558 (1999)

VAN BELLE, G. T. See BODEN, A. F., et al. The Visual Orbit of ι Pegasi.

VANDEN BERK, DANIEL E. Determining the Fraction of Intrinsic C IV Absorption in Quasi-stellar Object Absorption-Line Systems. *Gordon T. Richards, Donald G. York, Brian Yanny, Ronald I. Kollgaard, S. A. Laurent-Muehleisen, & Daniel E. Vanden Berk.* 513, 576 (1999)

VAN DEN BOSCH, FRANK C. Evidence for a Massive Black Hole in the S0 Galaxy NGC 4342. *Nicolas Cretton & Frank C. van den Bosch.* 514, 704 (1999)

Substructure in Dark Halos: Orbital Eccentricities and Dynamical Friction. *Frank C. van den Bosch, Geraint F. Lewis, George Lake, & Joachim Stadel.* 515, 50 (1999)

VAN DEN HEUVEL, E. P. J. Could 2S 0114+650 Be a Magnetar? *X.-D. Li & E. P. J. van den Heuvel.* 513, L45 (1999)

VAN DER HOOFT, F. Hard X-Ray Variability of the Black Hole Candidate GRO J0422+32 during Its 1992 Outburst. *F. van der Hooft, C. Kouveliotou, J. van Paradijs, W. S. Paciesas, W. H. G. Lewin, M. van der Klis, D. J. Crary, M. H. Finger, B. A. Harmon, & S. N. Zhang.* 513, 477 (1999)

VAN DER KLIS, M. See VAN DER HOOFT, F., et al. Hard X-Ray Variability of the Black Hole Candidate GRO J0422+32 during Its 1992 Outburst.

VAN DER KLIS, MICHIEL. Discovery of Twin Kilohertz Quasi-periodic Oscillations in the High Galactic Latitude X-Ray Transient XTE J2123−058. *Jeroen Homan, Mariano Mendez, Rudy Wijnands, Michiel van der Klis, & Jan van Paradijs.* 513, L119 (1999)

The Broadband Power Spectra of X-Ray Binaries. *Rudy Wijnands & Michiel van der Klis.* 514, 939 (1999)

VAN DISHOECK, EWINE F. Envelope Structure of Deeply Embedded Young Stellar Objects in the Serpens Molecular Cloud. *Michiel R. Hogerheijde, Ewine F. van Dishoeck, Jante M. Salverda, & Geoffrey A. Blake.* 513, 350 (1999)

Infrared Space Observatory–Long Wavelength Spectrometer Detection of the 112 Micron HD $J = 1 \rightarrow 0$ Line toward the Orion Bar. *Christopher M. Wright, Ewine F. van Dishoeck, Pierre Cox, Sunil D. Sidher, & Martin F. Kessler.* 515, L29 (1999)

Far-Infrared and Submillimeter Observations and Physical Models of the Reflection Nebula Cederblad 201. *Ciska Kemper, Marco Spaans, David J. Jansen, Michiel R. Hogerheijde, Ewine F. van Dishoeck, & Alexander G. G. M. Tielens.* 515, 649 (1999)

VAN PARADIJS, J. See VAN DER HOOFT, F., et al. Hard X-Ray Variability of the Black Hole Candidate GRO J0422+32 during Its 1992 Outburst.

VAN PARADIJS, JAN. *Rossi X-Ray Timing Explorer* Observations of the Anomalous Pulsar 4U 0142+61. *Colleen A. Wilson, Stefan Dieters, Mark H. Finger, D. Matthew Scott, & Jan van Paradijs.* 513, 464 (1999)

Discovery of Twin Kilohertz Quasi-periodic Oscillations in the High Galactic Latitude X-Ray Transient XTE J2123−058. *Jeroen Homan, Mariano Mendez, Rudy Wijnands, Michiel van der Klis, & Jan van Paradijs.* 513, L119 (1999)

VANTURE, ANDREW D. Is U Aquarii a Thorne-Zytkow Object? *Andrew D. Vanture, Daniel Zucker, & George Wallerstein.* 514, 932 (1999)

VASISHT, G. X-Ray Variability from the Compact Source in the Supernova Remnant RCW 103. *E. V. Gotthelf, R. Petre, & G. Vasisht.* 514, L107 (1999)

VAUGHAN, BRIAN A. *Rossi X-Ray Timing Explorer* Observation of Cygnus X-1. III. Implications for Compton Corona and Advection-dominated Accretion Flow Models. *Michael A. Nowak, Jörn Wilms, Brian A. Vaughan, James B. Dove, & Mitchell C. Begelman.* 515, 726 (1999)

VAZDEKIS, A. Evolutionary Stellar Population Synthesis at 2 Å Spectral Resolution. *A. Vazdekis.* 513, 224 (1999)

VÁZQUEZ, M. Time Series of Solar Granulation Images. II. Evolution of Individual Granules. *J. Hirzberger, J. A. Bonet, M. Vázquez, & A. Hanslmeier.* 515, 441 (1999)

VÁZQUEZ, ROBERTO. Radio Continuum and Recombination Line Observations of the Polypolar Planetary Nebula NGC 2440. *Roberto Vázquez, José M. Torrelles, Luis F. Rodríguez, Yolanda Gómez, J. Alberto López, & Luis F. Miranda.* 515, 633 (1999)

VÁZQUEZ-SEMADENI, ENRIQUE. Clouds as Turbulent Density Fluctuations: Implications for Pressure Confinement and Spectral Line Data Interpretation. *Javier Ballesteros-Paredes, Enrique Vázquez-Semadeni, & John Scalo.* 515, 286 (1999)

VENTURI, T. The Radio-Optical Jet in NGC 3862 from Parsec to Subkiloparsec Scales. *L. Lara, L. Feretti, G. Giovannini, S. Baum, W. D. Cotton, C. P. O'Dea, & T. Venturi.* 513, 197 (1999)

VIEIRA, WERNER M. Relativistic and Newtonian Core-Shell Models: Analytical and Numerical Results. *Werner M. Vieira & Patricio S. Letelier.* 513, 383 (1999)

VIETRI, M. See PIRO, L., et al. The X-Ray Afterglow of the Gamma-Ray Burst of 1997 May 8: Spectral Variability and Possible Evidence of an Iron Line. .

VIVEKANAND, M. Competing Drifting Radio Subpulses in PSR B0031−07. *M. Vivekanand & B. C. Joshi.* 515, 398 (1999)

VOGEL, P. Neutrino Fluence after *r*-Process Freezeout and Abundances of Te Isotopes in Presolar Diamonds. *Y. Z. Qian, P. Vogel, & G. J. Wasserburg.* 513, 956 (1999)

VOGES, W. See DE GRANDI, S., et al. The X-Ray Luminosity Function of Bright Galaxy Clusters in the Local Universe.

See DE GRANDI, S., et al. A Flux-limited Sample of Bright Clusters of Galaxies from the Southern Part of the *ROSAT* All-Sky Survey: The Catalog and log N–log$S$.

WADE, RICHARD A. Application of Realistic Model Atmospheres to Eclipse Maps of Accretion Disks: The Effective Temperature and Flare of the Disk in the Dwarf Nova Z Chamaeleontis. *Edward L. Robinson, Janet H. Wood, & Richard A. Wade.* 514, 952 (1999)

WAGNER, R. M. The R Aquarii Jet in Hindsight. *J. M. Hollis, R. Bertram, R. M. Wagner, & C. O. Lampland.* 514, 895 (1999)

WAGNER, S. J. See KATAOKA, J., et al. High-Energy Emission from the TeV Blazar Markarian 501 during Multiwavelength Observations in 1996.

WALDEN, ANDREW T. The Search for Solar Gravity-Mode Oscillations: An Analysis Using *Ulysses* Magnetic Field Data. *David G. T. Denison & Andrew T. Walden.* 514, 972 (1999)

WALLACE, J. K. See BODEN, A. F., et al. The Visual Orbit of ι Pegasi.

WALLERSTEIN, GEORGE. Is U Aquarii a Thorne-Zytkow Object? *Andrew D. Vanture, Daniel Zucker, & George Wallerstein.* 514, 932 (1999)

WALMSLEY, C. MALCOLM. Hot Gas and Dust in a Protostellar Cluster near W3(OH). *Friedrich Wyrowski, Peter Schilke, C. Malcolm Walmsley, & Karl M. Menten.* 514, L43 (1999)

WALTHER, GUENTHER. On the Solar-Cycle Modulation of the Homestake Solar Neutrino Capture Rate and the Shuffle Test. *Guenther Walther.* 513, 990 (1999)

WALTON, STEPHEN R. Restoration and Photometry of Full-Disk Solar Images. *Stephen R. Walton & Dora G. Preminger.* 514, 959 (1999)

WANAJO, SHINYA. Evolution of 3–9 $M_\odot$ Stars for $z = 0.001$–0.03 and Metallicity Effects on Type Ia Supernovae. *Hideyuki Umeda, Ken'ichi Nomoto, Hitoshi Yamaoka, & Shinya Wanajo.* 513, 861 (1999)

WANG, GWO-PING. See CHOU, DEAN-YI, et al. Acoustic Imaging in Helioseismology.

WANG, HAIMIN. Extreme-Ultraviolet Jets and Hα Surges in Solar Microflares. *Jongchul Chae, Jiong Qiu, Haimin Wang, & Philip R. Goode.* 513, L75 (1999)

WANG, JING. On the Structure and Morphology of the "Diffuse Ionized Medium" in Star-forming Galaxies. *Jing Wang, Timothy M. Heckman, & Matthew D. Lehnert.* 515, 97 (1999)

WANG, T. Broadband X-Ray Observations of the Narrow-Line X-Ray Galaxy NGC 5506. *T. Wang, T. Mihara, C. Otani, M. Matsuoka, & H. Awaki.* 515, 567 (1999)

WANG, Z.-R. Disk Accretion onto Magnetized Neutron Stars: The Inner Disk Radius and Fastness Parameter. *X.-D. Li & Z.-R. Wang.* 513, 845 (1999)

WARD-THOMPSON, DEREK. L1448 IRS 2: A HIRES-identified Class 0 Protostar. *JoAnn O'Linger, Grace Wolf-Chase, Mary Barsony, & Derek Ward-Thompson.* 515, 696 (1999)

WASSERBURG, G. J. Neutrino Fluence after *r*-Process Freezeout and Abundances of Te Isotopes in Presolar Diamonds. *Y. Z. Qian, P. Vogel, & G. J. Wasserburg.* 513, 956 (1999)

WATSON, ALAN M. Ultracompact H II Regions with Extended Radio-Continuum Emission. *Stanley E. Kurtz, Alan M. Watson, Peter Hofner, & Birgit Otte.* 514, 232 (1999)

See PAHRE, MICHAEL A., et al. Detection of Surface Brightness Fluctuations in NGC 4373 Using the *Hubble Space Telescope*.

See KRIST, JOHN E., et al. *Hubble Space Telescope* WFPC2 Imaging of XZ Tauri: Time Evolution of a Herbig-Haro Bow Shock.

WAXMAN, ELI. A Subrelativistic Shock Model for the Radio Emission of SN 1998bw. *Eli Waxman & Abraham Loeb.* 515, 721 (1999)

WEAVER, KIMBERLY A. *ASCA* Observations of the Starburst-driven Superwind Galaxy NGC 2146: Broadband (0.6–9 keV) Spectral Properties. *Roberto Della Ceca, Richard E. Griffiths, Timothy M. Heckman, Matthew D. Lehnert, & Kimberly A. Weaver.* 514, 772 (1999)

WEI, J. Y. New Wolf-Rayet Galaxies with Detection of WC Stars. *J. H. Huang, Q. S. Gu, L. Ji, W. D. Li, J. Y. Wei, & W. Zheng.* 513, 215 (1999)

WEINBERGER, A. J. High Spatial Resolution Imaging of Arp 220 from 3 to 25 Microns. *B. T. Soifer, G. Neugebauer, K. Matthews, E. E. Becklin, M. Ressler, M. W. Werner, A. J. Weinberger, & E. Egami.* 513, 207 (1999)

WELCH, W. J. W. The Redshift of the Gravitationally Lensed Radio Source PKS 1830−211. *C. Lidman, F. Courbin, G. Meylan, T. Broadhurst, B. Frye, & W. J. W. Welch.* 514, L57 (1999)

WERNER, M. W. High Spatial Resolution Imaging of Arp 220 from 3 to 25 Microns. *B. T. Soifer, G. Neugebauer, K. Matthews, E. E. Becklin, M. Ressler, M. W. Werner, A. J. Weinberger, & E. Egami.* 513, 207 (1999)

WESTPHAL, JAMES A. See PAHRE, MICHAEL A., et al. Detection of Surface Brightness Fluctuations in NGC 4373 Using the *Hubble Space Telescope*.

WEX, N. Frame Dragging and Other Precessional Effects in Black Hole Pulsar Binaries. *N. Wex & S. M. Kopeikin.* 514, 388 (1999)

WEYMANN, R. J. A Statistical Study of Rest-Frame Optical Emission Properties in Luminous Quasars at $2.0 \leq z \leq 2.5$. *D. H. McIntosh, M. J. Rieke, H.-W. Rix, C. B. Foltz, & R. J. Weymann.* 514, 40 (1999)

WHITE, GLENN J. A High-Velocity Molecular Cloud near the Center of the Galaxy. *Tomoharu Oka, Glenn J. White, Tetsuo Hasegawa, Fumio Sato, Masato Tsuboi, & Atsushi Miyazaki.* 515, 249 (1999)

WHITE, MARTIN. Interferometric Observation of Cosmic Microwave Background Anisotropies. *Martin White, John E. Carlstrom, Mark Dragovan, & William L. Holzapfel.* 514, 12 (1999)

WHITE, ORAN R. Magnetic and Radiative Variability of Solar Surface Structures. I. Image Decomposition and Magnetic-Intensity Mapping. *Karen L. Harvey & Oran R. White.* 515, 812 (1999)

WHITE, R. L. Discovery of a Radio-loud/Radio-quiet Binary Quasar. *M. S. Brotherton, Michael D. Gregg, R. H. Becker, S. A. Laurent-Muehleisen, R. L. White, & S. A. Stanford.* 514, L61 (1999)

WHITE, S. M. A Study of Microwave-selected Coronal Transient Brightenings. *A. Nindos, M. R. Kundu, & S. M. White.* 513, 983 (1999)

WHITMORE, BRADLEY C. The Globular Cluster System in the Inner Region of M87. *Arunav Kundu, Bradley C. Whitmore, William B. Sparks, F. Duccio Macchetto, Stephen E. Zepf, & Keith M. Ashman.* 513, 733 (1999)

WHYBORN, N. See ANDREANI, P., et al. The Enhancement and Decrement of the Sunyaev-Zeldovich Effect toward the *ROSAT* Cluster RX J0658−5557.

WIECZOREK, G. J. See CHADWICK, P. M., et al. Very High Energy Gamma Rays from PKS 2155−304.

WIJNANDS, RUDY. Discovery of Twin Kilohertz Quasi-periodic Oscillations in the High Galactic Latitude X-Ray Transient XTE J2123−058. *Jeroen Homan, Mariano Mendez, Rudy Wijnands, Michiel van der Klis, & Jan van Paradijs.* 513, L119 (1999)

The Broadband Power Spectra of X-Ray Binaries. *Rudy Wijnands & Michiel van der Klis.* 514, 939 (1999)

WIKLIND, T. Detection of CO (4–3), CO (9–8), and Dust Emission in the Broad Absorption Line Quasar APM 08279+5255 at a Redshift of 3.9. *D. Downes, R. Neri, T. Wiklind, D. J. Wilner, & P. A. Shaver.* 513, L1 (1999)

WILKES, B. J. The PG X-Ray QSO Sample: Links between the Ultraviolet–X-Ray Continuum and Emission Lines. *Beverley J. Wills, A. Laor, M. S. Brotherton, D. Wills, B. J. Wilkes, G. J. Ferland, & Zhaohui Shang.* 515, L53 (1999)

WILKES, BELINDA J. Investigation of the Relation between the Spectral Energy Distributions and the Emission Lines in Low-Redshift Quasars. *Belinda J. Wilkes, Joanna Kuraszkiewicz, Paul J. Green, Smita Mathur, & Jonathan C. McDowell.* 513, 76 (1999)

WILLIAMS, JONATHAN P. A High-Resolution Study of the Slowly Contracting, Starless Core L1544. *Jonathan P. Williams, Philip C. Myers, David J. Wilner, & James Di Francesco.* 513, L61 (1999)

WILLIAMS, R. E. See SAVAGLIO, S., et al. The Lyα Forest of the Quasar in the Hubble Deep Field South.

WILLIS, A. G. Radio Polarimetric Imaging of the Interstellar Medium: Magnetic Field and Diffuse Ionized Gas Structure near the W3/W4/W5/HB 3 Complex. *A. D. Gray, T. L. Landecker, P. E. Dewdney, A. R. Taylor, A. G. Willis, & M. Normandeau.* 514, 221 (1999)

WILLS, BEVERLEY J. The PG X-Ray QSO Sample: Links between the Ultraviolet–X-Ray Continuum and Emission Lines. *Beverley J. Wills, A. Laor, M. S. Brotherton, D. Wills, B. J. Wilkes, G. J. Ferland, & Zhaohui Shang.* 515, L53 (1999)

WILLS, D. The PG X-Ray QSO Sample: Links between the Ultraviolet–X-Ray Continuum and Emission Lines. *Beverley J. Wills, A. Laor, M. S. Brotherton, D. Wills, B. J. Wilkes, G. J. Ferland, & Zhaohui Shang.* 515, L53 (1999)

WILMS, JÖRN. *Rossi X-Ray Timing Explorer* Observation of Cygnus X-1. III. Implications for Compton Corona and Advection-dominated Accretion Flow Models. *Michael A. Nowak, Jörn Wilms, Brian A. Vaughan, James B. Dove, & Mitchell C. Begelman.* 515, 726 (1999)

WILNER, D. J. Detection of CO (4–3), CO (9–8), and Dust Emission in the Broad Absorption Line Quasar APM 08279+5255 at a Redshift of 3.9. *D. Downes, R. Neri, T. Wiklind, D. J. Wilner, & P. A. Shaver.* 513, L1 (1999)

The Synchrotron Jet from the H_2O Maser Source in W3(OH). *D. J. Wilner, M. J. Reid, & Karl M. Menten.* 513, 775 (1999)

WILNER, DAVID J. A High-Resolution Study of the Slowly Contracting, Starless Core L1544. *Jonathan P. Williams, Philip C. Myers, David J. Wilner, & James Di Francesco.* 513, L61 (1999)

WILSON, A. S. Do Jet-driven Shocks Ionize the Narrow-Line Regions of Seyfert Galaxies? *A. S. Wilson & J. C. Raymond.* 513, L115 (1999)

WILSON, CHRISTINE D. Submillimeter Continuum Emission in the ρ Ophiuchi Molecular Cloud: Filaments, Arcs, and an Unidentified Far-Infrared Object. *Christine D. Wilson, Lorne W. Avery, Michel Fich, Doug Johnstone, Gilles Joncas, Lewis B. G. Knee, Henry E. Matthews, George F. Mitchell, Gerald H. Moriarty-Schieven, & Ralph E. Pudritz.* 513, L139 (1999)

WILSON, COLLEEN A. *Rossi X-Ray Timing Explorer* Observations of the Anomalous Pulsar 4U 0142+61. *Colleen A. Wilson, Stefan Dieters, Mark H. Finger, D. Matthew Scott, & Jan van Paradijs.* 513, 464 (1999)

WILSON, J. See SAVAGLIO, S., et al. The Lyα Forest of the Quasar in the Hubble Deep Field South.

WINKLER, P. FRANK. Supernova Remnants in the Magellanic Clouds. II. Supernova Remnant Breakouts from N11L and N86. *Rosa Murphy Williams, You-Hua Chu, John R. Dickel, R. Chris Smith, Douglas K. Milne, & P. Frank Winkler.* 514, 798 (1999)

WOITKE, P. First Observations of an R Coronae Borealis Star with the Space Telescope Imaging Spectrograph: RY Sagittarii near Maximum Light. *Geoffrey C. Clayton, T. R. Ayres, Warrick A. Lawson, John S. Drilling, P. Woitke, & Martin Asplund.* 515, 351 (1999)

WOLF-CHASE, GRACE. L1448 IRS 2: A HIRES-identified Class 0 Protostar. *JoAnn O'Linger, Grace Wolf-Chase, Mary Barsony, & Derek Ward-Thompson.* 515, 696 (1999)

WOLSZCZAN, ALEX. Resonance in PSR B1257+12 Planetary System. *Maciej Konacki, Andrzej J. Maciejewski, & Alex Wolszczan.* 513, 471 (1999)

WOLTER, ANNA. The REX Survey: A Search for Radio-emitting X-Ray Sources. *Alessandro Caccianiga, Tommaso Maccacaro, Anna Wolter, Roberto Della Ceca, & Isabella M. Gioia.* 513, 51 (1999)

WOO, JONG-HAK. The Ultraviolet Upturn in Elliptical Galaxies as an Age Indicator. *Sukyoung Yi, Young-Wook Lee, Jong-Hak Woo, Jang-Hyun Park, Pierre Demarque, & Augustus Oemler, Jr.* 513, 128 (1999)

WOO, RICHARD. Extension of the Polar Coronal Hole Boundary into Interplanetary Space. *Richard Woo, Shadia Rifai Habbal, Russell A. Howard, & Clarence M. Korendyke.* 513, 961 (1999)

WOOD, JANET H. Application of Realistic Model Atmospheres to Eclipse Maps of Accretion Disks: The Effective Temperature and Flare of the Disk in the Dwarf Nova Z Chamaeleontis. *Edward L. Robinson, Janet H. Wood, & Richard A. Wade.* 514, 952 (1999)

WOODGATE, BRUCE E. Using Temporal Variations of the Nonthermal Redshifted Ly*alpha* Emission to Deduce Properties of Proton Beams Injected into a Stellar Atmosphere. *Jeffrey W. Brosius & Bruce E. Woodgate.* 514, 430 (1999)

WRIGHT, CHRISTOPHER M. *Infrared Space Observatory*–Long Wavelength Spectrometer Detection of the 112 Micron HD $J = 1 \rightarrow 0$ Line toward the Orion Bar. *Christopher M. Wright, Ewine F. van Dishoeck, Pierre Cox, Sunil D. Sidher, & Martin F. Kessler.* 515, L29 (1999)

WRIGHT, MELVYN C. H. See FALCKE, HEINO, et al. A Major Radio Outburst in III Zw 2 with an Extremely Inverted, Millimeter-peaked Spectrum.

WYROWSKI, FRIEDRICH. Hot Gas and Dust in a Protostellar Cluster near W3(OH). *Friedrich Wyrowski, Peter Schilke, C. Malcolm Walmsley, & Karl M. Menten.* 514, L43 (1999)

XU, YU-LIN. Comparison between Multisphere Light-scattering Calculations: Rigorous Solution and Discrete-Dipole Approximation. *Yu-lin Xu & Bo Å. S. Gustafson.* 513, 894 (1999)

YA'ARI, A. On the Pulsation Mode of Mira Variables: Nonlinear Calculations Compared with Radius Observations. *A. Ya'ari & Y. Tuchman.* 514, L35 (1999)

YAHIL, AMOS. A New Catalog of Photometric Redshifts in the Hubble Deep Field. *Alberto Fernández-Soto, Kenneth M. Lanzetta, & Amos Yahil.* 513, 34 (1999)

YAMAMOTO, KAZUYOSI. Reaction of H Atoms with Solid C_2H_4 and C_2H_6 at 13 K. *Kenzo Hiraoka, Kazuyosi Yamamoto, Yoshihide Kihara, Toshikazu Takayama, & Tetsuya Sato.* 514, 524 (1999)

YAMAOKA, HITOSHI. Evolution of 3–9 $M_\odot$ Stars for $z = 0.001$–0.03 and Metallicity Effects on Type Ia Supernovae. *Hideyuki Umeda, Ken'ichi Nomoto, Hitoshi Yamaoka, & Shinya Wanajo.* 513, 861 (1999)

YAN, MIN. Theoretical Modeling of *ISO* Results on Planetary Nebula NGC 7027. *Min Yan, S. R. Federman, A. Dalgarno, & J. E. Bjorkman.* 515, 640 (1999)

YANNY, BRIAN. Determining the Fraction of Intrinsic C IV Absorption in Quasi-stellar Object Absorption-Line Systems. *Gordon T. Richards, Donald G. York, Brian Yanny, Ronald I. Kollgaard, S. A. Laurent-Muehleisen, & Daniel E. Vanden Berk.* 513, 576 (1999)

YEH, SHENG-JEN. See CHOU, DEAN-YI, et al. Acoustic Imaging in Helioseismology.

YEPES, G. Self-regulating Galaxy Formation as an Explanation for the Tully-Fisher Relation. *D. Elizondo, G. Yepes, R. Kates, V. Müller, & A. Klypin.* 515, 525 (1999)

YI, INSU. On Radio and X-Ray Emission Mechanisms in Nearby, X-Ray–bright Galactic Nuclei. *Insu Yi & Stephen P. Boughn.* 515, 576 (1999)

YI, SUKYOUNG. The Ultraviolet Upturn in Elliptical Galaxies as an Age Indicator. *Sukyoung Yi, Young-Wook Lee, Jong-Hak Woo, Jang-Hyun Park, Pierre Demarque, & Augustus Oemler, Jr.* 513, 128 (1999)

YIP, C. W. The Quadrupole Oscillations of Strange Quark Stars. *C. W. Yip, M.-C. Chu, & P. T. Leung.* 513, 849 (1999)

YORK, DONALD G. Determining the Fraction of Intrinsic C IV Absorption in Quasi-stellar Object Absorption-Line Systems. *Gordon T. Richards, Donald G. York, Brian Yanny, Ronald I. Kollgaard, S. A. Laurent-Muehleisen, & Daniel E. Vanden Berk.* 513, 576 (1999)

YOSHIDA, SHIN'ICHIROU. A Numerical Study of Normal Modes of Rotating Neutron Star Models by the Cowling Approximation. *Shin'ichirou Yoshida & Yoshiharu Eriguchi.* 515, 414 (1999)

YOSHIKAWA, KOHJI. Reconstructing the Radial Profiles of Gas Density and Temperature in Clusters of Galaxies from High-Resolution X-Ray and Radio Observations. *Kohji Yoshikawa & Yasushi Suto.* 513, 549 (1999)

YOSHINO, AKIRA. Optical versus Mid-Infrared Spectroscopic Classification of Ultraluminous Infrared Galaxies. *Yoshiaki Taniguchi, Akira Yoshino, Youichi Ohyama, & Shingo Nishiura.* 514, 660 (1999)

YOUNG, ANDREW J. X-Ray Iron Line Reverberation from Black Hole Accretion Disks. *Chistopher S. Reynolds, Andrew J. Young, Mitchell C. Begelman, & Andrew C. Fabian.* 514, 164 (1999)

YOUNG, JUDITH S. The Efficiency of Star Formation in Galaxies as a Function of Galaxy Size and Environment. *Judith S. Young.* 514, L87 (1999)

YUN, M. S. Counterrotating Nuclear Disks in Arp 220. *K. Sakamoto, N. Z. Scoville, M. S. Yun, M. Crosas, R. Genzel, & L. J. Tacconi.* 514, 68 (1999)

See FRAYER, D. T., et al. Molecular Gas in the $z = 2.565$ Submillimeter Galaxy SMM J14011+0252.

YUN, MIN SU. The Radio-to-Submillimeter Spectral Index as a Redshift Indicator. *C. L. Carilli & Min Su Yun.* 513, L13 (1999)

ZABLUDOFF, ANN I. The Isolated Elliptical Galaxy NGC 1132: Evidence for a Merged Group of Galaxies? *John S. Mulchaey & Ann I. Zabludoff.* 514, 133 (1999)

ZAVLIN, VYATCHESLAV E. The Thermal X-Ray Spectra of Centaurus X-4, Aquila X-1, and 4U 1608−522 in Quiescence. *Robert E. Rutledge, Lars Bildsten, Edward F. Brown, George G. Pavlov, & Vyatcheslav E. Zavlin.* 514, 945 (1999)

ZEPF, STEPHEN E. The Globular Cluster System in the Inner Region of M87. *Arunav Kundu, Bradley C. Whitmore, William B. Sparks, F. Duccio Macchetto, Stephen E. Zepf, & Keith M. Ashman.* 513, 733 (1999)

ZHANG, BING. Is Coherence Essential to Account for Pulsar Radio Emission? *Bing Zhang, B. H. Hong, & G. J. Qiao.* 514, L111 (1999)

ZHANG, BO. A Model for Calculating the Abundances of Neutron-Capture Elements in Metal-poor Stars. *Bo Zhang, Ji Li, Caixia Zhang, Yanchun Liang, & Qiuhe Peng.* 513, 910 (1999)

ZHANG, CAIXIA. A Model for Calculating the Abundances of Neutron-Capture Elements in Metal-poor Stars. *Bo Zhang, Ji Li, Caixia Zhang, Yanchun Liang, & Qiuhe Peng.* 513, 910 (1999)

ZHANG, L. Multicomponent X-Ray Emissions from Regions near or on the Pulsar Surface. *K. S. Cheng & L. Zhang.* 515, 337 (1999)

ZHANG, MING. A Markov Stochastic Process Theory of Cosmic-Ray Modulation. *Ming Zhang.* 513, 409 (1999)

ZHANG, S. N. See VAN DER HOOFT, F., et al. Hard X-Ray Variability of the Black Hole Candidate GRO J0422+32 during Its 1992 Outburst.

ZHENG, W. New Wolf-Rayet Galaxies with Detection of WC Stars. *J. H. Huang, Q. S. Gu, L. Ji, W. D. Li, J. Y. Wei, & W. Zheng.* 513, 215 (1999)

ZIJLSTRA, ALBERT. The "Water-Fountain Nebula" IRAS 16342−3814: *Hubble Space Telescope*/Very Large Array Study of a Bipolar Protoplanetary Nebula. *Raghvendra Sahai, Peter te Lintel Hekkert, Mark Morris, Albert Zijlstra, & Lauren Likkel.* 514, L115 (1999)

ZUBKO, VICTOR G. On the Model of Dust in the Small Magellanic Cloud. *Victor G. Zubko.* 513, L29 (1999)

ZUCKER, ARIK. Three-dimensional Stereoscopic Analysis of Solar Active Region Loops. I. *SOHO*/EIT Observations at Temperatures of (1.0–1.5) $\times 10^6$ K. *Markus J. Aschwanden, Jeffrey S. Newmark, Jean-Pierre Delaboudinière, Werner M. Neupert, J. A. Klimchuk, G. Allen Gary, Fabrice Portier-Fozzani, & Arik Zucker.* 515, 842 (1999)

ZUCKER, DANIEL. Is U Aquarii a Thorne-Zytkow Object? *Andrew D. Vanture, Daniel Zucker, & George Wallerstein.* 514, 932 (1999)

ZWEIBEL, ELLEN G. Absorption/Emission of Solar *p*-Modes: Michelson Doppler Interferometer/*SOHO* Observations. *Deborah Haber, Rekha Jain, & Ellen G. Zweibel.* 515, 832 (1999)

SUBJECT INDEX

PARTS 1 & 2, VOLUMES 513 –515

1999 MARCH 1 TO APRIL 20

ACCELERATION OF PARTICLES

Radio to Gamma-Ray Emission from Shell-Type Supernova Remnants: Predictions from Nonlinear Shock Acceleration Models. *Matthew G. Baring, Donald C. Ellison, Stephen P. Reynolds, Isabelle A. Grenier, & Philippe Goret.* 513, 311 (1999)

A Major Radio Outburst in III Zw 2 with an Extremely Inverted, Millimeter-peaked Spectrum. *Heino Falcke, Geoffrey C. Bower, Andrew P. Lobanov, Thomas P. Krichbaum, Alok R. Patnaik, Margo F. Aller, Hugh D. Aller, Harri Teräsranta, Melvyn C. H. Wright, & Göran Sandell.* 514, L17 (1999)

Transport and Acceleration of Energetic Charged Particles near an Oblique Shock. *D. Ruffolo.* 515, 787 (1999)

Stochastic Acceleration of Electrons by Plasma Waves. III. Waves Propagating Perpendicular to the Magnetic Field. *Julia M. Pryadko & Vahé Petrosian.* 515, 873 (1999)

ACCRETION, ACCRETION DISKS

Line-driven Ablation and Wind Tilting by External Irradiation. *K. G. Gayley, S. P. Owocki, & S. R. Cranmer.* 513, 442 (1999)

Hard X-Ray Variability of the Black Hole Candidate GRO J0422+32 during Its 1992 Outburst. *F. van der Hooft, C. Kouveliotou, J. van Paradijs, W. S. Paciesas, W. H. G. Lewin, M. van der Klis, D. J. Crary, M. H. Finger, B. A. Harmon, & S. N. Zhang.* 513, 477 (1999)

Variable-Frequency Quasi-periodic Oscillations from the Galactic Microquasar GRS 1915+105. *Craig B. Markwardt, Jean H. Swank, & Ronald E. Taam.* 513, L37 (1999)

Rossby Wave Instability of Keplerian Accretion Disks. *R. V. E. Lovelace, H. Li, S. A. Colgate, & A. F. Nelson.* 513, 805 (1999)

A Population of Faint Nontransient Low-Mass Black Hole Binaries. *Kristen Menou, Ramesh Narayan, & Jean-Pierre Lasota.* 513, 811 (1999)

Relativistic Precession around Rotating Neutron Stars: Effects Due to Frame Dragging and Stellar Oblateness. *Sharon M. Morsink & Luigi Stella.* 513, 827 (1999)

Disk Accretion onto Magnetized Neutron Stars: The Inner Disk Radius and Fastness Parameter. *X.-D. Li & Z.-R. Wang.* 513, 845 (1999)

A Comment on the Viscous Stability of Relativistic Keplerian Accretion Disks. *Rafal Moderski & Bozena Czerny.* 513, L123 (1999)

X-Ray Iron Line Reverberation from Black Hole Accretion Disks. *Christopher S. Reynolds, Andrew J. Young, Mitchell C. Begelman, & Andrew C. Fabian.* 514, 164 (1999)

Flares from the Tidal Disruption of Stars by Massive Black Holes. *Andrew Ulmer.* 514, 180 (1999)

On the Azimuthal Structure of Thermal Convection in Circumstellar Disks. *H. H. Klahr, Th. Henning, & W. Kley.* 514, 325 (1999)

Tidally Induced Gap Formation in Protostellar Disks: Gap Clearing and Suppression of Protoplanetary Growth. *G. Bryden, Xingming Chen, D. N. C. Lin, Richard P. Nelson, & John C. B. Papaloizou.* 514, 344 (1999)

Magnetic Propeller Outflows. *R. V. E. Lovelace, M. M. Romanova, & G. S. Bisnovatyi-Kogan.* 514, 368 (1999)

X-Ray Shots of Cygnus X-1. *Y. X. Feng, T. P. Li, & L. Chen.* 514, 373 (1999)

Discovery of Microsecond Soft Lags in the X-Ray Emission of the Atoll Source 4U 1636−536. *Philip Kaaret, Santina Piraino, Eric C. Ford, & Andrea Santangelo.* 514, L31 (1999)

Hydrodynamic Simulations of Counterrotating Accretion Disks. *O. A. Kuznetsov, R. V. E. Lovelace, M. M. Romanova, & V. M. Chechetkin.* 514, 691 (1999)

The Broadband Power Spectra of X-Ray Binaries. *Rudy Wijnands & Michiel van der Klis.* 514, 939 (1999)

The Thermal X-Ray Spectra of Centaurus X-4, Aquila X-1, and 4U 1608−522 in Quiescence. *Robert E. Rutledge, Lars Bildsten, Edward F. Brown, George G. Pavlov, & Vyatcheslav E. Zavlin.* 514, 945 (1999)

Application of Realistic Model Atmospheres to Eclipse Maps of Accretion Disks: The Effective Temperature and Flare of the Disk in the Dwarf Nova Z Chamaeleontis. *Edward L. Robinson, Janet H. Wood, & Richard A. Wade.* 514, 952 (1999)

X-Ray Novae, Event Horizons, and the Exponential Metric. *Stanley L. Robertson.* 515, 365 (1999)

On Radio and X-Ray Emission Mechanisms in Nearby, X-Ray–bright Galactic Nuclei. *Insu Yi & Stephen P. Boughn.* 515, 576 (1999)

Rossi X-Ray Timing Explorer Observation of Cygnus X-1. III. Implications for Compton Corona and Advection-dominated Accretion Flow Models. *Michael A. Nowak, Jörn Wilms, Brian A. Vaughan, James B. Dove, & Mitchell C. Begelman.* 515, 726 (1999)

Accretion Disk Reversal and the Spin-up/Spin-down of Accreting Pulsars. *James R. Murray, Martijn de Kool, & Jianke Li.* 515, 738 (1999)

The Effect of an Isothermal Atmosphere on the Propagation of Three-dimensional Waves in a Thermally Stratified Accretion Disk. *G. I. Ogilvie & S. H. Lubow.* 515, 767 (1999)

Magnetorotational Instability in Protoplanetary Disks. I. On the Global Stability of Weakly Ionized Disks with Ohmic Dissipation. *Takayoshi Sano & Shoken M. Miyama.* 515, 776 (1999)

The PG X-Ray QSO Sample: Links between the Ultraviolet–X-Ray Continuum and Emission Lines. *Beverley J. Wills, A. Laor, M. S. Brotherton, D. Wills, B. J. Wilkes, G. J. Ferland, & Zhaohui Shang.* 515, L53 (1999)

Thermal X-Ray Line Emission from Accreting Black Holes. *Ramesh Narayan & John Raymond.* 515, L69 (1999)

Magnetized Accretion inside the Marginally Stable Orbit around a Black Hole. *J. H. Krolik.* 515, L73 (1999)

Toward the Evidence of the Accretion Disk Emission in the Symbiotic Star RR Telescopii. *Hee-Won Lee & Myeong-Gu Park.* 515, L89 (1999)

ASTROMETRY

A Precision Test of *Hipparcos* Systematics toward the Hyades. *Vijay K. Narayanan & Andrew Gould.* 515, 256 (1999)

Hubble Space Telescope Fine Guidance Sensor Astrometric Parallaxes for Three Dwarf Novae: SS Aurigae, SS Cygni, and U Geminorum. *Thomas E. Harrison, Bernard J. McNamara, Paula Szkody, Barbara E. McArthur, G. F. Benedict, Arnold R. Klemola, & Ronald L. Gilliland.* 515, L93 (1999)

ATOMIC DATA

Theoretical Oscillator Strengths and Hyperfine Structure in Hg II. *Tomas Brage, Charles Proffitt, & David S. Leckrone.* 513, 524 (1999)

Analysis of the Triplet Transitions from the $3d^2$ Configuration in Fe VII. *E. Charro & I. Martín.* 513, 997 (1999)

Improving Predictions for Helium Emission Lines. *Robert A. Benjamin, Evan D. Skillman, & Derck P. Smits.* 514, 307 (1999)

ATOMIC PROCESSES

Experimental Stark Widths and Shifts of Several Ne I Spectral Lines. *J. A. del Val, J. A. Aparicio, & S. Mar.* 513, 535 (1999)

BLACK HOLE PHYSICS

Relativistic and Newtonian Core-Shell Models: Analytical and Numerical Results. *Werner M. Vieira & Patricio S. Letelier.* 513, 383 (1999)

Dynamics of Plasma Close to the Horizon of a Schwarzschild Black Hole. *Wenchien Chou & Toshiki Tajima.* 513, 401 (1999)

Variable-Frequency Quasi-periodic Oscillations from the Galactic Microquasar GRS 1915+105. *Craig B. Markwardt, Jean H. Swank, & Ronald E. Taam.* 513, L37 (1999)

A Population of Faint Nontransient Low-Mass Black Hole Binaries. *Kristen Menou, Ramesh Narayan, & Jean-Pierre Lasota.* 513, 811 (1999)

X-Ray Iron Line Reverberation from Black Hole Accretion Disks. *Christopher S. Reynolds, Andrew J. Young, Mitchell C. Begelman, & Andrew C. Fabian.* 514, 164 (1999)

Flares from the Tidal Disruption of Stars by Massive Black Holes. *Andrew Ulmer.* 514, 180 (1999)

Radio and X-Ray Observations of the 1998 Outburst of the Recurrent X-Ray Transient 4U 1630−47. *R. M. Hjellming, M. P. Rupen, A. J. Mioduszewski, E. Kuulkers, M. McCollough, B. A. Harmon, M. Buxton, R. Sood, A. Tzioumis, D. Rayner, S. Dieters, & P. Durouchoux.* 514, 383 (1999)

Frame Dragging and Other Precessional Effects in Black Hole Pulsar Binaries. *N. Wex & S. M. Kopeikin.* 514, 388 (1999)

Evidence for a Massive Black Hole in the S0 Galaxy NGC 4342. *Nicolas Cretton & Frank C. van den Bosch.* 514, 704 (1999)

Collisional Stellar Dynamics around Massive Black Holes in Active Galactic Nuclei. *Kevin P. Rauch.* 514, 725 (1999)

The Broadband Power Spectra of X-Ray Binaries. *Rudy Wijnands & Michiel van der Klis.* 514, 939 (1999)

X-Ray Novae, Event Horizons, and the Exponential Metric. *Stanley L. Robertson.* 515, 365 (1999)

Nuclear Disks of Gas and Dust in Early-Type Galaxies and the Hunt for Massive Black Holes: *Hubble Space Telescope* Observations of NGC 6251. *Laura Ferrarese & Holland C. Ford.* 515, 583 (1999)

Rossi X-Ray Timing Explorer Observation of Cygnus X-1. III. Implications for Compton Corona and Advection-dominated Accretion Flow Models. *Michael A. Nowak, Jörn Wilms, Brian A. Vaughan, James B. Dove, & Mitchell C. Begelman.* 515, 726 (1999)

Thermal X-Ray Line Emission from Accreting Black Holes. *Ramesh Narayan & John Raymond.* 515, L69 (1999)

Magnetized Accretion inside the Marginally Stable Orbit around a Black Hole. *J. H. Krolik.* 515, L73 (1999)

CELESTIAL MECHANICS, STELLAR DYNAMICS

On the Self-consistent Response of Stellar Systems to Gravitational Shocks. *Oleg Y. Gnedin & Jeremiah P. Ostriker.* 513, 626 (1999)

Tidal Shocking by Extended Mass Distributions. *Oleg Y. Gnedin, Lars Hernquist, & Jeremiah P. Ostriker.* 514, 109 (1999)

Collisional Stellar Dynamics around Massive Black Holes in Active Galactic Nuclei. *Kevin P. Rauch.* 514, 725 (1999)

Substructure in Dark Halos: Orbital Eccentricities and Dynamical Friction. *Frank C. van den Bosch, Geraint F. Lewis, George Lake, & Joachim Stadel.* 515, 50 (1999)

COMETS: GENERAL

Sodium Tails of Comets: Na/O and Na/Si Abundances in Interplanetary Dust Particles. *Frans J. M. Rietmeijer.* 514, L125 (1999)

COMETS: INDIVIDUAL

Name: Hale-Bopp 1995 O1

Sodium Tails of Comets: Na/O and Na/Si Abundances in Interplanetary Dust Particles. *Frans J. M. Rietmeijer.* 514, L125 (1999)

CONDUCTION

Simulation of Magnetic Reconnection with Heat Conduction. *P. F. Chen, C. Fang, Y. H. Tang, & M. D. Ding.* 513, 516 (1999)

CONVECTION

Stellar Envelope Convection Calibrated by Radiation Hydrodynamics Simulations: Influence on Globular Cluster Isochrones. *Bernd Freytag & Maurizio Salaris.* 513, L49 (1999)

On the Azimuthal Structure of Thermal Convection in Circumstellar Disks. *H. H. Klahr, Th. Henning, & W. Kley.* 514, 325 (1999)

Source of Solar Acoustic Modes. *R. Nigam & A. G. Kosovichev.* 514, L53 (1999)

Time Series of Solar Granulation Images. II. Evolution of Individual Granules. *J. Hirzberger, J. A. Bonet, M. Vázquez, & A. Hanslmeier.* 515, 441 (1999)

COSMOLOGY: COSMIC MICROWAVE BACKGROUND

Cosmic Microwave Background Anisotropies in the Cold Dark Matter Model: A Covariant and Gauge-invariant Approach. *Anthony Challinor & Anthony Lasenby.* 513, 1 (1999)

The Enhancement and Decrement of the Sunyaev-Zeldovich Effect toward the *ROSAT* Cluster RX J0658−5557. *P. Andreani, H. Böhringer, G. Dall'Oglio, L. Martinis, P. Shaver, R. Lemke, L.-Å. Nyman, R. Booth, L. Pizzo, N. Whyborn, Y. Tanaka, & H. Liang.* 513, 23 (1999)

Hard X-Ray Radiation in the Coma Cluster Spectrum. *Roberto Fusco-Femiano, Daniele Dal Fiume, Luigina Feretti, Gabriele Giovannini, Paola Grandi, Giorgio Matt, Silvano Molendi, & Andrea Santangelo.* 513, L21 (1999)

Interferometric Observation of Cosmic Microwave Background Anisotropies. *Martin White, John E. Carlstrom, Mark Dragovan, & William L. Holzapfel.* 514, 12 (1999)

Weak Lensing: Prospects for Measuring Cosmological Parameters. *Wayne Hu & Max Tegmark.* 514, L65 (1999)

Cosmological Constraints from Current Cosmic Microwave Background and Type Ia Supernova Data: A Brute Force, Eight-Parameter Analysis. *Max Tegmark.* 514, L69 (1999)

Temperature Anisotropies and Distortions Induced by Hot Intracluster Gas on the Cosmic Microwave Background. *F. Atrio-Barandela & J. P. Mücket.* 515, 465 (1999)

The $z = 1.6748$ C I Absorber toward PKS 1756+237. *Katherine C. Roth & James M. Bauer.* 515, L57 (1999)

COSMOLOGY: DARK MATTER

Reconstructing the Radial Profiles of Gas Density and Temperature in Clusters of Galaxies from High-Resolution X-Ray and Radio Observations. *Kohji Yoshikawa & Yasushi Suto.* 513, 549 (1999)

Quark Nuggets as Baryonic Dark Matter. *Jan-e Alam, Sibaji Raha, & Bikash Sinha.* 513, 572 (1999)

Is Galactic Dark Matter White? *G. Chabrier.* 513, L103 (1999)

Gravitational Lensing and Dark Structures. *Yu-Chung N. Cheng & Lawrence M. Krauss.* 514, 25 (1999)

Microlens Parallaxes with *SIRTF*. *Andrew Gould.* 514, 869 (1999)

Substructure in Dark Halos: Orbital Eccentricities and Dynamical Friction. *Frank C. van den Bosch, Geraint F. Lewis, George Lake, & Joachim Stadel.* 515, 50 (1999)

Accurate Determination of the Lagrangian Bias for the Dark Matter Halos. *Y. P. Jing.* 515, L45 (1999)

COSMOLOGY: DIFFUSE RADIATION

Radiative Transfer in a Clumpy Universe. III. The Nature of Cosmological Ionizing Sources. *Piero Madau, Francesco Haardt, & Martin J. Rees.* 514, 648 (1999)

On the Structure and Morphology of the "Diffuse Ionized Medium" in Star-forming Galaxies. *Jing Wang, Timothy M. Heckman, & Matthew D. Lehnert.* 515, 97 (1999)

COSMOLOGY: DISTANCE SCALE

The Enhancement and Decrement of the Sunyaev-Zeldovich Effect toward the *ROSAT* Cluster RX J0658−5557. *P. Andreani, H. Böhringer, G. Dall'Oglio, L. Martinis, P. Shaver, R. Lemke, L.-Å. Nyman, R. Booth, L. Pizzo, N. Whyborn, Y. Tanaka, & H. Liang.* 513, 23 (1999)

The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XV. A Cepheid Distance to the Fornax Cluster and Its Implications. *Barry F. Madore, Wendy L. Freeman, N. Silbermann, Paul Harding, John Huchra, Jeremy R. Mould, John A. Graham, Laura Ferrarese, Brad K. Gibson, Mingsheng Han, John G. Hoessel, Shaun M. Hughes, Garth D. Illingworth, Randy Phelps, Shoko Sakai, & Peter Stetson.* 515, 29 (1999)

Velocity Dispersion of the Gravitational Lens 0957+561. *John L. Tonry & Marijn Franx.* 515, 512 (1999)

COSMOLOGY: EARLY UNIVERSE

Quark Nuggets as Baryonic Dark Matter. *Jan-e Alam, Sibaji Raha, & Bikash Sinha.* 513, 572 (1999)

Molecular Gas in the $z = 2.565$ Submillimeter Galaxy SMM J14011+0252. *D. T. Frayer, R. J. Ivison, N. Z. Scoville, A. S. Evans, M. S. Yun, Ian Smail, A. J. Barger, A. W. Blain, & J.-P. Kneib.* 514, L13 (1999)

Lack of Iron Abundance Evolution in High-Redshift QSOs. *Keith L. Thompson, Gary J. Hill, & Richard Elston.* 515, 487 (1999)

COSMOLOGY: GRAVITATIONAL LENSING

Detection of CO (4–3), CO (9–8), and Dust Emission in the Broad Absorption Line Quasar APM 08279+5255 at a Redshift of 3.9. *D. Downes, R. Neri, T. Wiklind, D. J. Wilner, & P. A. Shaver.* 513, L1 (1999)

Determining the Fraction of Intrinsic C IV Absorption in Quasi-stellar Object Absorption-Line Systems. *Gordon T. Richards, Donald G. York, Brian Yanny, Ronald I. Kollgaard, S. A. Laurent-Muehleisen, & Daniel E. Vanden Berk.* 513, 576 (1999)

A Lensed Arc in the Low-Redshift Cluster Abell 2124. *John P. Blakeslee & Mark R. Metzger.* 513, 592 (1999)

First Comparison of Ionization and Metallicity in Two Lines of Sight toward HE 1104−1805A,B at $z = 1.66$. *Sebastian Lopez, Dieter Reimers, Michael Rauch, Wallace L. W. Sargent, & Alain Smette.* 513, 598 (1999)

Spectrophotometric Resolution of Stellar Surfaces with Microlensing. *B. Scott Gaudi & Andrew Gould.* 513, 619 (1999)

A Possible Gravitational Lens in the Hubble Deep Field South. *Rennan Barkana, Roger Blandford, & David W. Hogg.* 513, L91 (1999)

Gravitational Lensing as a Probe of Quintessence. *Asantha R. Cooray & Dragan Huterer.* 513, L95 (1999)

Gravitational Lensing and Dark Structures. *Yu-Chung N. Cheng & Lawrence M. Krauss.* 514, 25 (1999)

Hubble Space Telescope Observations of the Gravitationally Lensed Cloverleaf Broad Absorption Line QSO H1413+1143: Modeling the Lens. *Kyu-Hyun Chae & David A. Turnshek.* 514, 587 (1999)

A Wavelet Exploration of the Q0957+561A,B Brightness Record. *R. Schild.* 514, 598 (1999)
Microlens Parallaxes with *SIRTF*. *Andrew Gould.* 514, 869 (1999)
The Redshift of the Gravitationally Lensed Radio Source PKS 1830−211. *C. Lidman, F. Courbin, G. Meylan, T. Broadhurst, B. Frye, & W. J. W. Welch.* 514, L57 (1999)
Weak Lensing: Prospects for Measuring Cosmological Parameters. *Wayne Hu & Max Tegmark.* 514, L65 (1999)
Microlensing in the Galactic Bulge: Effects of the Disk behind the Bulge. *Vibhat Nair & Jordi Miralda-Escudé.* 515, 206 (1999)
Weak Lensing by Large-Scale Structure and the Polarization Properties of Distant Radio Sources. *Gabriela C. Surpi & Diego D. Harari.* 515, 455 (1999)
Velocity Dispersion of the Gravitational Lens 0957+561. *John L. Tonry & Marijn Franx.* 515, 512 (1999)

COSMOLOGY: LARGE-SCALE STRUCTURE OF UNIVERSE

Cosmic Microwave Background Anisotropies in the Cold Dark Matter Model: A Covariant and Gauge-invariant Approach. *Anthony Challinor & Anthony Lasenby.* 513, 1 (1999)
A Global Descriptor of Spatial Pattern Interaction in the Galaxy Distribution. *Martin Kerscher, María Jesús Pons-Bordería, Jens Schmalzing, Roberto Trasarti-Battistoni, Thomas Buchert, Vicent J. Martínez, & Riccardo Valdarnini.* 513, 543 (1999)
How Dark Matter Halos Cluster in Lagrangian Space. *Cristiano Porciani, Paolo Catelan, & Cedric Lacey.* 513, L99 (1999)
Where Are the Baryons? *Renyue Cen & Jeremiah P. Ostriker.* 514, 1 (1999)
Weakly Nonlinear Clustering for Arbitrary Expansion Histories. *Marc Kamionkowski & Ari Buchalter.* 514, 7 (1999)
The Scale of Homogeneity in the Las Campanas Redshift Survey. *Luca Amendola & Emilia Palladino.* 514, L1 (1999)
Fractal Correlations in the CfA2–South Redshift Survey. *M. Joyce, M. Montuori, & F. Sylos Labini.* 514, L5 (1999)
Quasar-Galaxy and AGN-Galaxy Cross-Correlations. *Héctor J. Martínez, Manuel E. Merchán, Carlos A. Valotto, & Diego G. Lambas.* 514, 558 (1999)
Biasing and High-Order Statistics from the Southern-Sky Redshift Survey. *C. Benoist, A. Cappi, L. N. da Costa, S. Maurogordato, F. R. Bouchet, & R. Schaeffer.* 514, 563 (1999)
Cumulant Correlators from the APM. *István Szapudi & Alexander S. Szalay.* 515, L43 (1999) (Orig. paper in 481, L1 (1997))
Weak Lensing by Large-Scale Structure and the Polarization Properties of Distant Radio Sources. *Gabriela C. Surpi & Diego D. Harari.* 515, 455 (1999)
Recovering the Primordial Density Fluctuations: A Comparison of Methods. *Vijay K. Narayanan & Rupert A. C. Croft.* 515, 471 (1999)
A New Measure of the Clustering of QSO Heavy-Element Absorption-Line Systems. *Jean M. Quashnock & Michael L. Stein.* 515, 506 (1999)
Accurate Determination of the Lagrangian Bias for the Dark Matter Halos. *Y. P. Jing.* 515, L45 (1999)

COSMOLOGY: OBSERVATIONS

The Enhancement and Decrement of the Sunyaev-Zeldovich Effect toward the *ROSAT* Cluster RX J0658−5557. *P. Andreani, H. Böhringer, G. Dall'Oglio, L. Martinis, P. Shaver, R. Lemke, L.-Å. Nyman, R. Booth, L. Pizzo, N. Whyborn, Y. Tanaka, & H. Liang.* 513, 23 (1999)
A New Catalog of Photometric Redshifts in the Hubble Deep Field. *Alberto Fernández-Soto, Kenneth M. Lanzetta, & Amos Yahil.* 513, 34 (1999)
Radio Identification of Submillimeter Sources in the Hubble Deep Field. *E. A. Richards.* 513, L9 (1999)
The X-Ray Luminosity Function of Bright Galaxy Clusters in the Local Universe. *S. De Grandi, L. Guzzo, H. Böhringer, S. Molendi, G. Chincarini, C. Collins, R. Cruddace, D. Neumann, S. Schindler, P. Schuecker, & W. Voges.* 513, L17 (1999)
A Possible Gravitational Lens in the Hubble Deep Field South. *Rennan Barkana, Roger Blandford, & David W. Hogg.* 513, L91 (1999)
Gravitational Lensing as a Probe of Quintessence. *Asantha R. Cooray & Dragan Huterer.* 513, L95 (1999)
A Narrowband Imaging Search for [O III] Emission from Galaxies at $z > 3$. *Harry I. Teplitz, Matthew A. Malkan, & Ian S. McLean.* 514, 33 (1999)
On Measuring Nebular Chemical Abundances in Distant Galaxies Using Global Emission-Line Spectra. *Henry A. Kobulnicky, Robert C. Kennicutt, Jr., & James L. Pizagno.* 514, 544 (1999)
The Redshift of the Gravitationally Lensed Radio Source PKS 1830−211. *C. Lidman, F. Courbin, G. Meylan, T. Broadhurst, B. Frye, & W. J. W. Welch.* 514, L57 (1999)
Cosmological Magnetic Field Limits in an Inhomogeneous Universe. *Pasquale Blasi, Scott Burles, & Angela V. Olinto.* 514, L79 (1999)
Streaming Velocities as a Dynamical Estimator of Ω. *P. G. Ferreira, R. Juszkiewicz, H. A. Feldman, M. Davis, & A. H. Jaffe.* 515, L1 (1999)
The Lyα Forest of the Quasar in the Hubble Deep Field South. *S. Savaglio, H. C. Ferguson, T. M. Brown, B. R. Espey, K. C. Sahu, S. A. Baum, C. M. Carollo, M. E. Kaiser, M. Stiavelli, R. E. Williams, & J. Wilson.* 515, L5 (1999)
Lack of Iron Abundance Evolution in High-Redshift QSOs. *Keith L. Thompson, Gary J. Hill, & Richard Elston.* 515, 487 (1999)
A New Measure of the Clustering of QSO Heavy-Element Absorption-Line Systems. *Jean M. Quashnock & Michael L. Stein.* 515, 506 (1999)
Velocity Dispersion of the Gravitational Lens 0957+561. *John L. Tonry & Marijn Franx.* 515, 512 (1999)
The Canada-UK Deep Submillimeter Survey: First Submillimeter Images, the Source Counts, and Resolution of the Background. *Stephen Eales, Simon Lilly, Walter Gear, Loretta Dunne, J. Richard Bond, Francois Hammer, Olivier Le Fèvre, & David Crampton.* 515, 518 (1999)
Testing the Relation between the Local and Cosmic Star Formation Histories. *Brian D. Fields.* 515, 603 (1999)

COSMOLOGY: THEORY

Cosmic Microwave Background Anisotropies in the Cold Dark Matter Model: A Covariant and Gauge-invariant Approach. *Anthony Challinor & Anthony Lasenby.* 513, 1 (1999)
Reconstructing the Radial Profiles of Gas Density and Temperature in Clusters of Galaxies from High-Resolution X-Ray and Radio Observations. *Kohji Yoshikawa & Yasushi Suto.* 513, 549 (1999)
The Cosmological Origin of the Tully-Fisher Relation. *Matthias Steinmetz & Julio F. Navarro.* 513, 555 (1999)
Gravitational Lensing as a Probe of Quintessence. *Asantha R. Cooray & Dragan Huterer.* 513, L95 (1999)
How Dark Matter Halos Cluster in Lagrangian Space. *Cristiano Porciani, Paolo Catelan, & Cedric Lacey.* 513, L99 (1999)
Where Are the Baryons? *Renyue Cen & Jeremiah P. Ostriker.* 514, 1 (1999)
Weakly Nonlinear Clustering for Arbitrary Expansion Histories. *Marc Kamionkowski & Ari Buchalter.* 514, 7 (1999)
Interferometric Observation of Cosmic Microwave Background Anisotropies. *Martin White, John E. Carlstrom, Mark Dragovan, & William L. Holzapfel.* 514, 12 (1999)
Constraints from the Hubble Deep Field on High-Redshift Quasar Models. *Zoltán Haiman, Piero Madau, & Abraham Loeb.* 514, 535 (1999)
Streaming Velocities as a Dynamical Estimator of Ω. *P. G. Ferreira, R. Juszkiewicz, H. A. Feldman, M. Davis, & A. H. Jaffe.* 515, L1 (1999)
Weak Lensing by Large-Scale Structure and the Polarization Properties of Distant Radio Sources. *Gabriela C. Surpi & Diego D. Harari.* 515, 455 (1999)
Temperature Anisotropies and Distortions Induced by Hot Intracluster Gas on the Cosmic Microwave Background. *F. Atrio-Barandela & J. P. Mücket.* 515, 465 (1999)
Accurate Determination of the Lagrangian Bias for the Dark Matter Halos. *Y. P. Jing.* 515, L45 (1999)

DENSE MATTER

The Quadrupole Oscillations of Strange Quark Stars. *C. W. Yip, M.-C. Chu, & P. T. Leung.* 513, 849 (1999)
Evidence for Antipodal Hot Spots during X-Ray Bursts from 4U 1636−536. *M. Coleman Miller.* 515, L77 (1999)

DIFFUSION

A Markov Stochastic Process Theory of Cosmic-Ray Modulation. *Ming Zhang.* 513, 409 (1999)
Magnetorotational Instability in Protoplanetary Disks. I. On the Global Stability of Weakly Ionized Disks with Ohmic Dissipation. *Takayoshi Sano & Shoken M. Miyama.* 515, 776 (1999)

ELEMENTARY PARTICLES

Quark Nuggets as Baryonic Dark Matter. *Jan-e Alam, Sibaji Raha, & Bikash Sinha.* 513, 572 (1999)
Evolution of Proto–Neutron Stars. *J. A. Pons, S. Reddy, M. Prakash, J. M. Lattimer, & J. A. Miralles.* 513, 780 (1999)
The Quadrupole Oscillations of Strange Quark Stars. *C. W. Yip, M.-C. Chu, & P. T. Leung.* 513, 849 (1999)

Neutrino Fluence after r-Process Freezeout and Abundances of Te Isotopes in Presolar Diamonds. *Y. Z. Qian, P. Vogel, & G. J. Wasserburg.* 513, 956 (1999)

EQUATION OF STATE

Evolution of Proto–Neutron Stars. *J. A. Pons, S. Reddy, M. Prakash, J. M. Lattimer, & J. A. Miralles.* 513, 780 (1999)

Evidence for Antipodal Hot Spots during X-Ray Bursts from 4U 1636−536. *M. Coleman Miller.* 515, L77 (1999)

GALAXIES: ABUNDANCES

Stellar Populations in Gas-rich Galaxy Mergers. II. Feedback Effects of Type Ia and Type II Supernovae. *Kenji Bekki & Yasuhiro Shioya.* 513, 108 (1999)

Carbon in Spiral Galaxies from *Hubble Space Telescope* Spectroscopy. *D. R. Garnett, G. A. Shields, M. Peimbert, S. Torres-Peimbert, E. D. Skillman, R. J. Dufour, E. Terlevich, & R. J. Terlevich.* 513, 168 (1999)

Evolutionary Stellar Population Synthesis at 2 Å Spectral Resolution. *A. Vazdekis.* 513, 224 (1999)

First Comparison of Ionization and Metallicity in Two Lines of Sight toward HE 1104−1805A,B at $z = 1.66$. *Sebastian Lopez, Dieter Reimers, Michael Rauch, Wallace L. W. Sargent, & Alain Smette.* 513, 598 (1999)

The Stellar Populations of Spiral Disks. II. Measuring and Modeling the Radial Distribution of Absorption Spectral Indices. *Mercedes Mollá, Eduardo Hardy, & Dominique Beauchamp.* 513, 695 (1999)

On Measuring Nebular Chemical Abundances in Distant Galaxies Using Global Emission-Line Spectra. *Henry A. Kobulnicky, Robert C. Kennicutt, Jr., & James L. Pizagno.* 514, 544 (1999)

Hot Gas Halo of NGC 3923: Circulation of Intergalactic Matter. *Shinji Sato & Yuzuru Tawara.* 514, 765 (1999)

Modeling the Radial Abundance Distribution of the Transition Galaxy NGC 1313. *Mercedes Mollá & Jean-René Roy.* 514, 781 (1999)

Dark Matter and the Chemical Evolution of Irregular Galaxies. *L. Carigi, P. Colín, & M. Peimbert.* 514, 787 (1999)

Stellar Metallicities and Type Ia Supernova Rates in the Early-Type Galaxy NGC 5846 from *ROSAT* and *ASCA* Observations. *A. Finoguenov, C. Jones, W. Forman, & L. David.* 514, 844 (1999)

Small-Scale Structure at High Redshift. I. Glimpses of the Interstellar Medium at Redshift ∼3.5. *Michael Rauch, Wallace L. W. Sargent, & Tom A. Barlow.* 515, 500 (1999)

A Comparison of Metal Enrichment Histories in Rich Clusters and Individual Luminous Elliptical Galaxies. *Fabrizio Brighenti & William G. Mathews.* 515, 542 (1999)

GALAXIES: ACTIVE

The REX Survey: A Search for Radio-emitting X-Ray Sources. *Alessandro Caccianiga, Tommaso Maccacaro, Anna Wolter, Roberto Della Ceca, & Isabella M. Gioia.* 513, 51 (1999)

Investigation of the Relation between the Spectral Energy Distributions and the Emission Lines in Low-Redshift Quasars. *Belinda J. Wilkes, Joanna Kuraszkiewicz, Paul J. Green, Smita Mathur, & Jonathan C. McDowell.* 513, 76 (1999)

Very High Energy Gamma Rays from PKS 2155−304. *P. M. Chadwick, K. Lyons, T. J. L. McComb, K. J. Orford, J. L. Osborne, S. M. Rayner, S. E. Shaw, K. E. Turver, & G. J. Wieczorek.* 513, 161 (1999)

Detection of CO (4–3), CO (9–8), and Dust Emission in the Broad Absorption Line Quasar APM 08279+5255 at a Redshift of 3.9. *D. Downes, R. Neri, T. Wiklind, D. J. Wilner, & P. A. Shaver.* 513, L1 (1999)

The Close Environment of Seyfert Galaxies and Its Implication for Unification Models. *D. Dultzin-Hacyan, Y. Krongold, I. Fuentes-Guridi, & P. Marziani.* 513, L111 (1999)

Do Jet-driven Shocks Ionize the Narrow-Line Regions of Seyfert Galaxies? *A. S. Wilson & J. C. Raymond.* 513, L115 (1999)

A Statistical Study of Rest-Frame Optical Emission Properties in Luminous Quasars at $2.0 \leq z \leq 2.5$. *D. H. McIntosh, M. J. Rieke, H.-W. Rix, C. B. Foltz, & R. J. Weymann.* 514, 40 (1999)

X-Ray Iron Line Reverberation from Black Hole Accretion Disks. *Christopher S. Reynolds, Andrew J. Young, Mitchell C. Begelman, & Andrew C. Fabian.* 514, 164 (1999)

Molecular Gas in the $z = 2.565$ Submillimeter Galaxy SMM J14011+0252. *D. T. Frayer, R. J. Ivison, N. Z. Scoville, A. S. Evans, M. S. Yun, Ian Smail, A. J. Barger, A. W. Blain, & J.-P. Kneib.* 514, L13 (1999)

A Major Radio Outburst in III Zw 2 with an Extremely Inverted, Millimeter-peaked Spectrum. *Heino Falcke, Geoffrey C. Bower, Andrew P. Lobanov, Thomas P. Krichbaum, Alok R. Patnaik, Margo F. Aller, Hugh D. Aller, Harri Teräsranta, Melvyn C. H. Wright, & Göran Sandell.* 514, L17 (1999)

Quasar-Galaxy and AGN-Galaxy Cross-Correlations. *Héctor J. Martínez, Manuel E. Merchán, Carlos A. Valotto, & Diego G. Lambas.* 514, 558 (1999)

The Starburst-AGN Connection in Active Galaxies: The Massive Nuclear Star-forming Disk in NGC 4303. *L. Colina & S. Arribas.* 514, 637 (1999)

Optical versus Mid-Infrared Spectroscopic Classification of Ultraluminous Infrared Galaxies. *Yoshiaki Taniguchi, Akira Yoshino, Youichi Ohyama, & Shingo Nishiura.* 514, 660 (1999)

A Cutoff in the X-Ray Fluctuation Power Density Spectrum of the Seyfert 1 Galaxy NGC 3516. *Rick Edelson & Kirpal Nandra.* 514, 682 (1999)

Collisional Stellar Dynamics around Massive Black Holes in Active Galactic Nuclei. *Kevin P. Rauch.* 514, 725 (1999)

Compact Nuclei in Galaxies at Moderate Redshift. II. Their Nature and Implications for the Active Galactic Nucleus Luminosity Function. *Vicki L. Sarajedini, Richard F. Green, Richard E. Griffiths, & Kavan Ratnatunga.* 514, 746 (1999)

ASCA and Contemporaneous Ground-based Observations of the BL Lacertae Objects 1749+096 and 2200+420 (BL Lac). *Rita M. Sambruna, Gabriele Ghisellini, Eric Hooper, R. I. Kollgaard, Joseph E. Pesce, & C. Megan Urry.* 515, 140 (1999)

The Synchrotron Peak Shift during High-Energy Flares of Blazars. *Markus Böttcher.* 515, L21 (1999)

No Evidence for Gamma-Ray Burst/Abell Cluster or Gamma-Ray Burst/Radio-quiet Quasar Correlations. *K. Hurley, D. H. Hartman, C. Kouveliotou, R. M. Kippen, J. Laros, T. Cline, & M. Boer.* 515, 497 (1999)

CTD 93 and the Nature of Gigahertz-peaked Spectrum Radio Sources. *David B. Shaffer, K. I. Kellermann, & T. J. Cornwell.* 515, 558 (1999)

Polarized Broad Hα Emission from the LINER Nucleus of NGC 1052. *Aaron J. Barth, Alexei V. Filippenko, & Edward C. Moran.* 515, L61 (1999)

GALAXIES: BL LACERTAE OBJECTS: GENERAL

The REX Survey: A Search for Radio-emitting X-Ray Sources. *Alessandro Caccianiga, Tommaso Maccacaro, Anna Wolter, Roberto Della Ceca, & Isabella M. Gioia.* 513, 51 (1999)

GALAXIES: BL LACERTAE OBJECTS: INDIVIDUAL

Name: Markarian 501

High-Energy Emission from the TeV Blazar Markarian 501 during Multiwavelength Observations in 1996. *J. Kataoka, J. R. Mattox, J. Quinn, H. Kubo, F. Makino, T. Takahashi, S. Inoue, R. C. Hartman, G. M. Madejski, P. Sreekumar, & S. J. Wagner.* 514, 138 (1999)

Alphanumeric: 1749+096

ASCA and Contemporaneous Ground-based Observations of the BL Lacertae Objects 1749+096 and 2200+420 (BL Lac). *Rita M. Sambruna, Gabriele Ghisellini, Eric Hooper, R. I. Kollgaard, Joseph E. Pesce, & C. Megan Urry.* 515, 140 (1999)

Alphanumeric: 2200+420

ASCA and Contemporaneous Ground-based Observations of the BL Lacertae Objects 1749+096 and 2200+420 (BL Lac). *Rita M. Sambruna, Gabriele Ghisellini, Eric Hooper, R. I. Kollgaard, Joseph E. Pesce, & C. Megan Urry.* 515, 140 (1999)

Alphanumeric: PKS 2155−304

Very High Energy Gamma Rays from PKS 2155−304. *P. M. Chadwick, K. Lyons, T. J. L. McComb, K. J. Orford, J. L. Osborne, S. M. Rayner, S. E. Shaw, K. E. Turver, & G. J. Wieczorek.* 513, 161 (1999)

GALAXIES: CLUSTERS: GENERAL

The X-Ray Luminosity Function of Bright Galaxy Clusters in the Local Universe. *S. De Grandi, L. Guzzo, H. Böhringer, S. Molendi, G. Chincarini, C. Collins, R. Cruddace, D. Neumann, S. Schindler, P. Schuecker, & W. Voges.* 513, L17 (1999)

A Global Descriptor of Spatial Pattern Interaction in the Galaxy Distribution. *Martin Kerscher, María Jesús Pons-Bordería, Jens Schmalzing, Roberto Trasarti-Battistoni, Thomas Buchert, Vicent J. Martínez, & Riccardo Valdarnini.* 513, 543 (1999)

Reconstructing the Radial Profiles of Gas Density and Temperature in Clusters of Galaxies from High-Resolution X-Ray and Radio Observations. *Kohji Yoshikawa & Yasushi Suto.* 513, 549 (1999)

Weakly Nonlinear Clustering for Arbitrary Expansion Histories. *Marc Kamionkowski & Ari Buchalter.* 514, 7 (1999)

Gravitational Lensing and Dark Structures. *Yu-Chung N. Cheng & Lawrence M. Krauss.* 514, 25 (1999)

The Isolated Elliptical Galaxy NGC 1132: Evidence for a Merged Group of Galaxies? *John S. Mulchaey & Ann I. Zabludoff.* 514, 133 (1999)

A Flux-limited Sample of Bright Clusters of Galaxies from the Southern Part of the *ROSAT* All-Sky Survey: The Catalog and log *N*–log*S*. *S. De Grandi, H. Böhringer, L. Guzzo, S. Molendi, G. Chincarini, C. Collins, R. Cruddace, D. Neumann, S. Schindler, P. Schuecker, & W. Voges.* 514, 148 (1999)

The Scale of Homogeneity in the Las Campanas Redshift Survey. *Luca Amendola & Emilia Palladino.* 514, L1 (1999)

Quasar-Galaxy and AGN-Galaxy Cross-Correlations. *Héctor J. Martínez, Manuel E. Merchán, Carlos A. Valotto, & Diego G. Lambas.* 514, 558 (1999)

On the Extreme-Ultraviolet Emission from Galaxy Clusters. *John S. Arabadjis & Joel N. Bregman.* 514, 607 (1999)

Temperature Anisotropies and Distortions Induced by Hot Intracluster Gas on the Cosmic Microwave Background. *F. Atrio-Barandela & J. P. Mücket.* 515, 465 (1999)

Recovering the Primordial Density Fluctuations: A Comparison of Methods. *Vijay K. Narayanan & Rupert A. C. Croft.* 515, 471 (1999)

No Evidence for Gamma-Ray Burst/Abell Cluster or Gamma-Ray Burst/Radio-quiet Quasar Correlations. *K. Hurley, D. H. Hartman, C. Kouveliotou, R. M. Kippen, J. Laros, T. Cline, & M. Boer.* 515, 497 (1999)

GALAXIES: CLUSTERS: INDIVIDUAL

Name: Abell 754

Rossi X-Ray Timing Explorer Hard X-Ray Observation of Abell 754: Constraining the Hottest Temperature Component and the Intracluster Magnetic Field. *Azita Valinia, Mark J. Henriksen, Michael Lowenstein, Kurt Roettiger, Richard F. Mushotzky, & Greg Madejski.* 515, 42 (1999)

Name: Abell 2124

A Lensed Arc in the Low-Redshift Cluster Abell 2124. *John P. Blakeslee & Mark R. Metzger.* 513, 592 (1999)

Name: Coma

Hard X-Ray Radiation in the Coma Cluster Spectrum. *Roberto Fusco-Femiano, Daniele Dal Fiume, Luigina Feretti, Gabriele Giovannini, Paola Grandi, Giorgio Matt, Silvano Molendi, & Andrea Santangelo.* 513, L21 (1999)

A Hot Spot in Coma. *R. Hank Donnelly, M. Markevitch, W. Forman, C. Jones, E. Churazov, & M. Gilfanov.* 513, 690 (1999)

Name: Fornax

The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XV. A Cepheid Distance to the Fornax Cluster and Its Implications. *Barry F. Madore, Wendy L. Freeman, N. Silbermann, Paul Harding, John Huchra, Jeremy R. Mould, John A. Graham, Laura Ferrarese, Brad K. Gibson, Mingsheng Han, John G. Hoessel, Shaun M. Hughes, Garth D. Illingworth, Randy Phelps, Shoko Sakai, & Peter Stetson.* 515, 29 (1999)

Alphanumeric: RX J0658−5557

The Enhancement and Decrement of the Sunyaev-Zeldovich Effect toward the *ROSAT* Cluster RX J0658−5557. *P. Andreani, H. Böhringer, G. Dall'Oglio, L. Martinis, P. Shaver, R. Lemke, L.-Å. Nyman, R. Booth, L. Pizzo, N. Whyborn, Y. Tanaka, & H. Liang.* 513, 23 (1999)

GALAXIES: DISTANCES AND REDSHIFTS

A New Catalog of Photometric Redshifts in the Hubble Deep Field. *Alberto Fernández-Soto, Kenneth M. Lanzetta, & Amos Yahil.* 513, 34 (1999)

The Radio-to-Submillimeter Spectral Index as a Redshift Indicator. *C. L. Carilli & Min Su Yun.* 513, L13 (1999)

Biasing and High-Order Statistics from the Southern-Sky Redshift Survey. *C. Benoist, A. Cappi, L. N. da Costa, S. Maurogordato, F. R. Bouchet, & R. Schaeffer.* 514, 563 (1999)

The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XIX. The Discovery of Cepheids in and a New Distance to NGC 3198. *Daniel D. Kelson, Garth D. Illingworth, Abhijit Saha, John A. Graham, Peter B. Stetson, Wendy L. Freedman, Robert C. Kennicutt, Jeremy R. Mould, Laura Ferrarese, John P. Huchra, Barry F. Madore, Charles F. Prosser, Fabio Bresolin, Holland C. Ford, Brad K. Gibson, John G. Hoessel, Shaun M. G. Hughes, Lucas M. Macri, Shoko Sakai, & N. A. Silbermann.* 514, 614 (1999)

The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XIV. The Cepheids in NGC 1365. *N. A. Silbermann, Paul Harding, Laura Ferrarese, Peter B. Stetson, Barry F. Madore, Robert C Kennicutt, Jr., Wendy L. Freedman, Jeremy R. Mould, Fabio Bresolin, Holland Ford, Brad K. Gibson, John A. Graham, Mingsheng Han, John G. Hoessel, Robert J. Hill, John Huchra, Shaun M. G. Hughes, Garth D. Illingworth, Dan Kelson, Lucas Macri, Randy Phelps, Daya Rawson, Shoko Sakai, & Anne Turner.* 515, 1 (1999)

The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XV. A Cepheid Distance to the Fornax Cluster and Its Implications. *Barry F. Madore, Wendy L. Freeman, N. Silbermann, Paul Harding, John Huchra, Jeremy R. Mould, John A. Graham, Laura Ferrarese, Brad K. Gibson, Mingsheng Han, John G. Hoessel, Shaun M. Hughes, Garth D. Illingworth, Randy Phelps, Shoko Sakai, & Peter Stetson.* 515, 29 (1999)

Detection of Surface Brightness Fluctuations in NGC 4373 Using the *Hubble Space Telescope*. *Michael A. Pahre, Jeremy R. Mould, Alan Dressler, Jon A. Holtzman, Alan M. Watson, John S. Gallagher III, Gilda E. Ballester, Christopher J. Burrows, Stefano Casertano, John T. Clarke, David Crisp, Richard E. Griffiths, Carl J. Grillmair, J. Jeff Hester, John G. Hoessel, Paul A. Scowen, Karl R. Stapelfeldt, John T. Trauger, & James A. Westphal.* 515, 79 (1999)

Streaming Velocities as a Dynamical Estimator of Ω. *P. G. Ferreira, R. Juszkiewicz, H. A. Feldman, M. Davis, & A. H. Jaffe.* 515, L1 (1999)

Self-regulating Galaxy Formation as an Explanation for the Tully-Fisher Relation. *D. Elizondo, G. Yepes, R. Kates, V. Müller, & A. Klypin.* 515, 525 (1999)

GALAXIES: DWARF

Properties of Galactic Outflows: Measurements of the Feedback from Star Formation. *Crystal L. Martin.* 513, 156 (1999)

GALAXIES: ELLIPTICAL AND LENTICULAR, CD

Stellar Populations in Gas-rich Galaxy Mergers. II. Feedback Effects of Type Ia and Type II Supernovae. *Kenji Bekki & Yasuhiro Shioya.* 513, 108 (1999)

The Ultraviolet Upturn in Elliptical Galaxies as an Age Indicator. *Sukyoung Yi, Young-Wook Lee, Jong-Hak Woo, Jang-Hyun Park, Pierre Demarque, & Augustus Oemler, Jr.* 513, 128 (1999)

Evolutionary Stellar Population Synthesis at 2 Å Spectral Resolution. *A. Vazdekis.* 513, 224 (1999)

Large Stellar Disks in Small Elliptical Galaxies. *Hans-Walter Rix, C. Marcella Carollo, & Ken Freeman.* 513, L25 (1999)

A Lensed Arc in the Low-Redshift Cluster Abell 2124. *John P. Blakeslee & Mark R. Metzger.* 513, 592 (1999)

The Isolated Elliptical Galaxy NGC 1132: Evidence for a Merged Group of Galaxies? *John S. Mulchaey & Ann I. Zabludoff.* 514, 133 (1999)

Evidence for a Massive Black Hole in the S0 Galaxy NGC 4342. *Nicolas Cretton & Frank C. van den Bosch.* 514, 704 (1999)

Detection of Surface Brightness Fluctuations in NGC 4373 Using the *Hubble Space Telescope*. *Michael A. Pahre, Jeremy R. Mould, Alan Dressler, Jon A. Holtzman, Alan M. Watson, John S. Gallagher III, Gilda E. Ballester, Christopher J. Burrows, Stefano Casertano, John T. Clarke, David Crisp, Richard E. Griffiths, Carl J. Grillmair, J. Jeff Hester, John G. Hoessel, Paul A. Scowen, Karl R. Stapelfeldt, John T. Trauger, & James A. Westphal.* 515, 79 (1999)

A Comparison of Metal Enrichment Histories in Rich Clusters and Individual Luminous Elliptical Galaxies. *Fabrizio Brighenti & William G. Mathews.* 515, 542 (1999)

Nuclear Disks of Gas and Dust in Early-Type Galaxies and the Hunt for Massive Black Holes: *Hubble Space Telescope* Observations of NGC 6251. *Laura Ferrarese & Holland C. Ford.* 515, 583 (1999)

GALAXIES: EVOLUTION

The Ultraviolet Upturn in Elliptical Galaxies as an Age Indicator. *Sukyoung Yi, Young-Wook Lee, Jong-Hak Woo, Jang-Hyun Park, Pierre Demarque, & Augustus Oemler, Jr.* 513, 128 (1999)

Starburst-driven Mass Loss from Dwarf Galaxies: Efficiency and Metal Ejection. *Mordecai-Mark Mac Low & Andrea Ferrara.* 513, 142 (1999)

Properties of Galactic Outflows: Measurements of the Feedback from Star Formation. *Crystal L. Martin.* 513, 156 (1999)

Carbon in Spiral Galaxies from *Hubble Space Telescope* Spectroscopy. *D. R. Garnett, G. A. Shields, M. Peimbert, S. Torres-Peimbert, E. D. Skillman, R. J. Dufour, E. Terlevich, & R. J. Terlevich.* 513, 168 (1999)

Radio Identification of Submillimeter Sources in the Hubble Deep Field. *E. A. Richards.* 513, L9 (1999)

The Radio-to-Submillimeter Spectral Index as a Redshift Indicator. *C. L. Carilli & Min Su Yun.* 513, L13 (1999)

Large Stellar Disks in Small Elliptical Galaxies. *Hans-Walter Rix, C. Marcella Carollo, & Ken Freeman.* 513, L25 (1999)

The Cosmological Origin of the Tully-Fisher Relation. *Matthias Steinmetz & Julio F. Navarro.* 513, 555 (1999)

Warped Galaxies from Misaligned Angular Momenta. *Victor P. Debattista & J. A. Sellwood.* 513, L107 (1999)

A Narrowband Imaging Search for [O III] Emission from Galaxies at $z > 3$. *Harry I. Teplitz, Matthew A. Malkan, & Ian S. McLean.* 514, 33 (1999)

Counterrotating Nuclear Disks in Arp 220. *K. Sakamoto, N. Z. Scoville, M. S. Yun, M. Crosas, R. Genzel, & L. J. Tacconi.* 514, 68 (1999)

Early Evolution of Disk Galaxies: Formation of Bulges in Clumpy Young Galactic Disks. *Masafumi Noguchi.* 514, 77 (1999)

Evolutionary Synthesis Modeling of Red Supergiant Features in the Near-Infrared. *Livia Origlia, Jeffrey D. Goldader, Claus Leitherer, Daniel Schaerer, & Ernesto Oliva.* 514, 96 (1999)

Evolutionary Status of Dwarf "Transition" Galaxies. *Patricia M. Knezek, Kenneth R. Sembach, & John S. Gallagher III.* 514, 119 (1999)

Molecular Gas in the $z = 2.565$ Submillimeter Galaxy SMM J14011+0252. *D. T. Frayer, R. J. Ivison, N. Z. Scoville, A. S. Evans, M. S. Yun, Ian Smail, A. J. Barger, A. W. Blain, & J.-P. Kneib.* 514, L13 (1999)

Hubble Space Telescope Observations of the Local Group Dwarf Galaxy Leo I. *Carme Gallart, Wendy L. Freedman, Mario Mateo, Cesare Chiosi, Ian B. Thompson, Antonio Aparicio, Gianpaolo Bertelli, Paul W. Hodge, Myung G. Lee, Edward W. Olszewski, Abhijit Saha, Peter B. Stetson, & Nicholas B. Suntzeff.* 514, 665 (1999)

Hydrodynamic Simulations of Counterrotating Accretion Disks. *O. A. Kuznetsov, R. V. E. Lovelace, M. M. Romanova, & V. M. Chechetkin.* 514, 691 (1999)

ASCA Observations of the Starburst-driven Superwind Galaxy NGC 2146: Broadband (0.6–9 keV) Spectral Properties. *Roberto Della Ceca, Richard E. Griffiths, Timothy M. Heckman, Matthew D. Lehnert, & Kimberly A. Weaver.* 514, 772 (1999)

Modeling the Radial Abundance Distribution of the Transition Galaxy NGC 1313. *Mercedes Mollá & Jean-René Roy.* 514, 781 (1999)

Dark Matter and the Chemical Evolution of Irregular Galaxies. *L. Carigi, P. Colín, & M. Peimbert.* 514, 787 (1999)

Discovery of a Radio-loud/Radio-quiet Binary Quasar. *M. S. Brotherton, Michael D. Gregg, R. H. Becker, S. A. Laurent-Muehleisen, R. L. White, & S. A. Stanford.* 514, L61 (1999)

On the Origin of Damped Lyα Systems: A Case for Low Surface Brightness Galaxies? *Raul Jimenez, David V. Bowen, & Francesca Matteucci.* 514, L83 (1999)

The Efficiency of Star Formation in Galaxies as a Function of Galaxy Size and Environment. *Judith S. Young.* 514, L87 (1999)

The Molecular ISM in Low Surface Brightness Disk Galaxies. *J. Christopher Mihos, Marco Spaans, & Stacy S. McGaugh.* 515, 89 (1999)

Lack of Iron Abundance Evolution in High-Redshift QSOs. *Keith L. Thompson, Gary J. Hill, & Richard Elston.* 515, 487 (1999)

The Canada-UK Deep Submillimeter Survey: First Submillimeter Images, the Source Counts, and Resolution of the Background. *Stephen Eales, Simon Lilly, Walter Gear, Loretta Dunne, J. Richard Bond, Francois Hammer, Olivier Le Fèvre, & David Crampton.* 515, 518 (1999)

Detection of Evolved High-Redshift Galaxies in Deep NICMOS/VLT Images. *Narciso Benitez, Tom Broadhurst, Rychard Bouwens, Joseph Silk, & Piero Rosati.* 515, L65 (1999)

GALAXIES: FORMATION

Stellar Populations in Gas-rich Galaxy Mergers. II. Feedback Effects of Type Ia and Type II Supernovae. *Kenji Bekki & Yasuhiro Shioya.* 513, 108 (1999)

Large Stellar Disks in Small Elliptical Galaxies. *Hans-Walter Rix, C. Marcella Carollo, & Ken Freeman.* 513, L25 (1999)

The Cosmological Origin of the Tully-Fisher Relation. *Matthias Steinmetz & Julio F. Navarro.* 513, 555 (1999)

Where Are the Baryons? *Renyue Cen & Jeremiah P. Ostriker.* 514, 1 (1999)

Early Evolution of Disk Galaxies: Formation of Bulges in Clumpy Young Galactic Disks. *Masafumi Noguchi.* 514, 77 (1999)

Constraints from the Hubble Deep Field on High-Redshift Quasar Models. *Zoltán Haiman, Piero Madau, & Abraham Loeb.* 514, 535 (1999)

Hydrodynamic Simulations of Counterrotating Accretion Disks. *O. A. Kuznetsov, R. V. E. Lovelace, M. M. Romanova, & V. M. Chechetkin.* 514, 691 (1999)

On the Origin of Damped Lyα Systems: A Case for Low Surface Brightness Galaxies? *Raul Jimenez, David V. Bowen, & Francesca Matteucci.* 514, L83 (1999)

Accurate Determination of the Lagrangian Bias for the Dark Matter Halos. *Y. P. Jing.* 515, L45 (1999)

GALAXIES: FUNDAMENTAL PARAMETERS

Gravitational Lensing and Dark Structures. *Yu-Chung N. Cheng & Lawrence M. Krauss.* 514, 25 (1999)

The Efficiency of Star Formation in Galaxies as a Function of Galaxy Size and Environment. *Judith S. Young.* 514, L87 (1999)

Satellites as Probes of the Masses of Spiral Galaxies. *Lance K. Erickson, S. T. Gottesman, & James H. Hunter, Jr.* 515, 153 (1999)

GALAXIES: GENERAL

Fractal Correlations in the CfA2–South Redshift Survey. *M. Joyce, M. Montuori, & F. Sylos Labini.* 514, L5 (1999)

Satellites as Probes of the Masses of Spiral Galaxies. *Lance K. Erickson, S. T. Gottesman, & James H. Hunter, Jr.* 515, 153 (1999)

GALAXIES: HALOS

Maximal Disks and the Tully-Fisher Relation. *Stéphane Courteau & Hans-Walter Rix.* 513, 561 (1999)

Warped Galaxies from Misaligned Angular Momenta. *Victor P. Debattista & J. A. Sellwood.* 513, L107 (1999)

Hot Gas Halo of NGC 3923: Circulation of Intergalactic Matter. *Shinji Sato & Yuzuru Tawara.* 514, 765 (1999)

A Comparison of Metal Enrichment Histories in Rich Clusters and Individual Luminous Elliptical Galaxies. *Fabrizio Brighenti & William G. Mathews.* 515, 542 (1999)

GALAXIES: INDIVIDUAL

Messier Number: M31

Hubble Space Telescope Images and Spectra of the Remnant of SN 1885 in M31. *Robert A. Fesen, Christopher L. Gerardy, Kevin M. McLin, & Andrew J. S. Hamilton.* 514, 195 (1999)

Chemical Abundances of Planetary Nebulae in the Bulge and Disk of M31. *George H. Jacoby & Robin Ciardullo.* 515, 169 (1999)

The Circumstellar Extinction of Planetary Nebulae. *Robin Ciardullo & George H. Jacoby.* 515, 191 (1999)

Messier Number: M83

The Eastern Arm of M83 Revisited: High-Resolution Mapping of ^{12}CO 1–0 Emission. *Richard J. Rand, Steven D. Lord, & James L. Higdon.* 513, 720 (1999)

Messier Number: M87

The Globular Cluster System in the Inner Region of M87. *Arunav Kundu, Bradley C. Whitmore, William B. Sparks, F. Duccio Macchetto, Stephen E. Zepf, & Keith M. Ashman.* 513, 733 (1999)

Messier Number: M101

Carbon in Spiral Galaxies from *Hubble Space Telescope* Spectroscopy. *D. R. Garnett, G. A. Shields, M. Peimbert, S. Torres-Peimbert, E. D. Skillman, R. J. Dufour, E. Terlevich, & R. J. Terlevich.* 513, 168 (1999)

NGC Number: NGC 205

Objects in NGC 205 Resolved into Stellar Associations by *Hubble Space Telescope* Ultraviolet Imaging. *Michele Cappellari, Francesco Bertola, David Burstein, Lucio M. Buson, Laura Greggio, & Alvio Renzini.* 515, L17 (1999)

NGC Number: NGC 1052

Polarized Broad Hα Emission from the LINER Nucleus of NGC 1052. *Aaron J. Barth, Alexei V. Filippenko, & Edward C. Moran.* 515, L61 (1999)

NGC Number: NGC 1068

Megamaser Disks in Active Galactic Nuclei. *John F. Kartje, Arieh Königl, & Moshe Elitzur.* 513, 180 (1999)

Extended Dust Emission and Atomic Hydrogen: A Reservoir of Diffuse H_2 in NGC 1068. *Padeli P. Papadopoulos & E. R. Seaquist.* 514, L95 (1999)

NGC Number: NGC 1132

The Isolated Elliptical Galaxy NGC 1132: Evidence for a Merged Group of Galaxies? *John S. Mulchaey & Ann I. Zabludoff.* 514, 133 (1999)

NGC Number: NGC 1313

Modeling the Radial Abundance Distribution of the Transition Galaxy NGC 1313. *Mercedes Mollá & Jean-René Roy.* 514, 781 (1999)

NGC Number: NGC 1365

The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XIV. The Cepheids in NGC 1365. *N. A. Silbermann, Paul Harding, Laura Ferrarese, Peter B. Stetson, Barry F. Madore, Robert C Kennicutt, Jr., Wendy L. Freedman, Jeremy R. Mould, Fabio Bresolin, Holland Ford, Brad K. Gibson, John A. Graham, Mingsheng Han, John G. Hoessel, Robert J. Hill, John Huchra, Shaun M. G. Hughes, Garth D. Illingworth, Dan Kelson, Lucas Macri, Randy Phelps, Daya Rawson, Shoko Sakai, & Anne Turner.* 515, 1 (1999)

The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XV. A Cepheid Distance to the Fornax Cluster and Its Implications. *Barry F. Madore, Wendy L. Freeman, N. Silbermann, Paul Harding, John Huchra, Jeremy R. Mould, John A. Graham, Laura Ferrarese, Brad K. Gibson, Mingsheng Han, John G. Hoessel, Shaun M. Hughes, Garth D. Illingworth, Randy Phelps, Shoko Sakai, & Peter Stetson.* 515, 29 (1999)

NGC Number: NGC 1614

High-Resolution Infrared Spectroscopy and Nuclear Clusters in the Starburst Galaxy NGC 1614. *P. J. Puxley & P. W. J. L. Brand.* 514, 675 (1999)

NGC Number: NGC 2403

Carbon in Spiral Galaxies from *Hubble Space Telescope* Spectroscopy. *D. R. Garnett, G. A. Shields, M. Peimbert, S. Torres-Peimbert, E. D. Skillman, R. J. Dufour, E. Terlevich, & R. J. Terlevich.* 513, 168 (1999)

NGC Number: NGC 3198

The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XIX. The Discovery of Cepheids in and a New Distance to NGC 3198. *Daniel D. Kelson, Garth D. Illingworth, Abhijit Saha, John A. Graham, Peter B. Stetson, Wendy L. Freedman, Robert C. Kennicutt, Jeremy R. Mould, Laura Ferrarese, John P. Huchra, Barry F. Madore, Charles F. Prosser, Fabio Bresolin, Holland C. Ford, Brad K. Gibson, John G. Hoessel, Shaun M. G. Hughes, Lucas M. Macri, Shoko Sakai, & N. A. Silbermann.* 514, 614 (1999)

NGC Number: NGC 3377A

Evolutionary Status of Dwarf "Transition" Galaxies. *Patricia M. Knezek, Kenneth R. Sembach, & John S. Gallagher III.* 514, 119 (1999)

NGC Number: NGC 3516

A Cutoff in the X-Ray Fluctuation Power Density Spectrum of the Seyfert 1 Galaxy NGC 3516. *Rick Edelson & Kirpal Nandra.* 514, 682 (1999)

NGC Number: NGC 3862

The Radio-Optical Jet in NGC 3862 from Parsec to Subkiloparsec Scales. *L. Lara, L. Feretti, G. Giovannini, S. Baum, W. D. Cotton, C. P. O'Dea, & T. Venturi.* 513, 197 (1999)

NGC Number: NGC 3923

Hot Gas Halo of NGC 3923: Circulation of Intergalactic Matter. *Shinji Sato & Yuzuru Tawara.* 514, 765 (1999)

NGC Number: NGC 4258

Megamaser Disks in Active Galactic Nuclei. *John F. Kartje, Arieh Königl, & Moshe Elitzur.* 513, 180 (1999)

NGC Number: NGC 4286

Evolutionary Status of Dwarf "Transition" Galaxies. *Patricia M. Knezek, Kenneth R. Sembach, & John S. Gallagher III.* 514, 119 (1999)

NGC Number: NGC 4303

The Stellar Populations of Spiral Disks. II. Measuring and Modeling the Radial Distribution of Absorption Spectral Indices. *Mercedes Mollá, Eduardo Hardy, & Dominique Beauchamp.* 513, 695 (1999)

The Starburst-AGN Connection in Active Galaxies: The Massive Nuclear Star-forming Disk in NGC 4303. *L. Colina & S. Arribas.* 514, 637 (1999)

NGC Number: NGC 4342

Evidence for a Massive Black Hole in the S0 Galaxy NGC 4342. *Nicolas Cretton & Frank C. van den Bosch.* 514, 704 (1999)

NGC Number: NGC 4373

Detection of Surface Brightness Fluctuations in NGC 4373 Using the *Hubble Space Telescope*. *Michael A. Pahre, Jeremy R. Mould, Alan Dressler, Jon A. Holtzman, Alan M. Watson, John S. Gallagher III, Gilda E. Ballester, Christopher J. Burrows, Stefano Casertano, John T. Clarke, David Crisp, Richard E. Griffiths, Carl J. Grillmair, J. Jeff Hester, John G. Hoessel, Paul A. Scowen, Karl R. Stapelfeldt, John T. Trauger, & James A. Westphal.* 515, 79 (1999)

NGC Number: NGC 4535

The Stellar Populations of Spiral Disks. II. Measuring and Modeling the Radial Distribution of Absorption Spectral Indices. *Mercedes Mollá, Eduardo Hardy, & Dominique Beauchamp.* 513, 695 (1999)

NGC Number: NGC 5506

Broadband X-Ray Observations of the Narrow-Line X-Ray Galaxy NGC 5506. *T. Wang, T. Mihara, C. Otani, M. Matsuoka, & H. Awaki.* 515, 567 (1999)

NGC Number: NGC 5846

Stellar Metallicities and Type Ia Supernova Rates in the Early-Type Galaxy NGC 5846 from *ROSAT* and *ASCA* Observations. *A. Finoguenov, C. Jones, W. Forman, & L. David.* 514, 844 (1999)

NGC Number: NGC 6251

Nuclear Disks of Gas and Dust in Early-Type Galaxies and the Hunt for Massive Black Holes: *Hubble Space Telescope* Observations of NGC 6251. *Laura Ferrarese & Holland C. Ford.* 515, 583 (1999)

NGC Number: NGC 7714

Multiwavelength Study of the Starburst Galaxy NGC 7714. I. Ultraviolet-Optical Spectroscopy. *Rosa M. González Delgado, María Luisa García-Vargas, Jeff Goldader, Claus Leitherer, & Anna Pasquali.* 513, 707 (1999)

Name: Arp 220

High Spatial Resolution Imaging of Arp 220 from 3 to 25 Microns. *B. T. Soifer, G. Neugebauer, K. Matthews, E. E. Becklin, M. Ressler, M. W. Werner, A. J. Weinberger, & E. Egami.* 513, 207 (1999)

Counterrotating Nuclear Disks in Arp 220. *K. Sakamoto, N. Z. Scoville, M. S. Yun, M. Crosas, R. Genzel, & L. J. Tacconi.* 514, 68 (1999)

Name: Leo I

Hubble Space Telescope Observations of the Local Group Dwarf Galaxy Leo I. *Carme Gallart, Wendy L. Freedman, Mario Mateo, Cesare Chiosi, Ian B. Thompson, Antonio Aparicio, Gianpaolo Bertelli, Paul W. Hodge, Myung G. Lee, Edward W. Olszewski, Abhijit Saha, Peter B. Stetson, & Nicholas B. Suntzeff.* 514, 665 (1999)

Name: Markarian 35

New Wolf-Rayet Galaxies with Detection of WC Stars. *J. H. Huang, Q. S. Gu, L. Ji, W. D. Li, J. Y. Wei, & W. Zheng.* 513, 215 (1999)

Name: Markarian 509

Highly Ionized High-Velocity Clouds: Intergalactic Gas in the Local Group or Distant Gas in the Galactic Halo? *Kenneth R. Sembach, Blair D. Savage, Limin Lu, & Edward M. Murphy.* 515, 108 (1999)

Name: Markarian 1039

New Wolf-Rayet Galaxies with Detection of WC Stars. *J. H. Huang, Q. S. Gu, L. Ji, W. D. Li, J. Y. Wei, & W. Zheng.* 513, 215 (1999)

Name: Small Magellanic Cloud

On the Model of Dust in the Small Magellanic Cloud. *Victor G. Zubko.* 513, L29 (1999)

Alphanumeric: CTD 93

CTD 93 and the Nature of Gigahertz-peaked Spectrum Radio Sources. *David B. Shaffer, K. I. Kellermann, & T. J. Cornwell.* 515, 558 (1999)

Alphanumeric: F08208+2816

New Wolf-Rayet Galaxies with Detection of WC Stars. *J. H. Huang, Q. S. Gu, L. Ji, W. D. Li, J. Y. Wei, & W. Zheng.* 513, 215 (1999)

Alphanumeric: G359.87+0.18

G359.87+0.18, An FR II Radio Galaxy 15′ from Sagittarius A*: Implications for the Scattering Region in the Galactic Center. *T. Joseph W. Lazio, K. R. Anantharamaiah, W. M. Goss, Namir E. Kassim, & James M. Cordes.* 515, 196 (1999)

Alphanumeric: HDFS 2232509−603243

A Possible Gravitational Lens in the Hubble Deep Field South. *Rennan Barkana, Roger Blandford, & David W. Hogg.* 513, L91 (1999)

Alphanumeric: IC 3475

Evolutionary Status of Dwarf "Transition" Galaxies. *Patricia M. Knezek, Kenneth R. Sembach, & John S. Gallagher III.* 514, 119 (1999)

Alphanumeric: PKS 2155−304

Highly Ionized High-Velocity Clouds: Intergalactic Gas in the Local Group or Distant Gas in the Galactic Halo? *Kenneth R. Sembach, Blair D. Savage, Limin Lu, & Edward M. Murphy.* 515, 108 (1999)

Alphanumeric: SMM J14011+0252

Molecular Gas in the $z = 2.565$ Submillimeter Galaxy SMM J14011+0252. *D. T. Frayer, R. J. Ivison, N. Z. Scoville, A. S. Evans, M. S. Yun, Ian Smail, A. J. Barger, A. W. Blain, & J.-P. Kneib.* 514, L13 (1999)

Alphanumeric: III Zw 2

A Major Radio Outburst in III Zw 2 with an Extremely Inverted, Millimeter-peaked Spectrum. *Heino Falcke, Geoffrey C. Bower, Andrew P. Lobanov, Thomas P. Krichbaum, Alok R. Patnaik, Margo F. Aller, Hugh D. Aller, Harri Teräsranta, Melvyn C. H. Wright, & Göran Sandell.* 514, L17 (1999)

GALAXIES: INTERACTIONS

Stellar Populations in Gas-rich Galaxy Mergers. II. Feedback Effects of Type Ia and Type II Supernovae. *Kenji Bekki & Yasuhiro Shioya.* 513, 108 (1999)

The Close Environment of Seyfert Galaxies and Its Implication for Unification Models. *D. Dultzin-Hacyan, Y. Krongold, I. Fuentes-Guridi, & P. Marziani.* 513, L111 (1999)

Counterrotating Nuclear Disks in Arp 220. *K. Sakamoto, N. Z. Scoville, M. S. Yun, M. Crosas, R. Genzel, & L. J. Tacconi.* 514, 68 (1999)

Tidal Shocking by Extended Mass Distributions. *Oleg Y. Gnedin, Lars Hernquist, & Jeremiah P. Ostriker.* 514, 109 (1999)

The Isolated Elliptical Galaxy NGC 1132: Evidence for a Merged Group of Galaxies? *John S. Mulchaey & Ann I. Zabludoff.* 514, 133 (1999)

Formation of Quasar Nuclei in the Hearts of Ultraluminous Infrared Galaxies. *Yoshiaki Taniguchi, Satoru Ikeuchi, & Yasuhiro Shioya.* 514, L9 (1999)

Discovery of a Radio-loud/Radio-quiet Binary Quasar. *M. S. Brotherton, Michael D. Gregg, R. H. Becker, S. A. Laurent-Muehleisen, R. L. White, & S. A. Stanford.* 514, L61 (1999)

The Efficiency of Star Formation in Galaxies as a Function of Galaxy Size and Environment. *Judith S. Young.* 514, L87 (1999)

Substructure in Dark Halos: Orbital Eccentricities and Dynamical Friction. *Frank C. van den Bosch, Geraint F. Lewis, George Lake, & Joachim Stadel.* 515, 50 (1999)

GALAXIES: INTERGALACTIC MEDIUM

A Hot Spot in Coma. *R. Hank Donnelly, M. Markevitch, W. Forman, C. Jones, E. Churazov, & M. Gilfanov.* 513, 690 (1999)

Radiative Transfer in a Clumpy Universe. III. The Nature of Cosmological Ionizing Sources. *Piero Madau, Francesco Haardt, & Martin J. Rees.* 514, 648 (1999)

ASCA Observations of the Starburst-driven Superwind Galaxy NGC 2146: Broadband (0.6–9 keV) Spectral Properties. *Roberto Della Ceca, Richard E. Griffiths, Timothy M. Heckman, Matthew D. Lehnert, & Kimberly A. Weaver.* 514, 772 (1999)

High-Velocity Clouds: Building Blocks of the Local Group. *Leo Blitz, David N. Spergel, Peter J. Teuben, Dap Hartmann, & W. Butler Burton.* 514, 818 (1999)

Stellar Metallicities and Type Ia Supernova Rates in the Early-Type Galaxy NGC 5846 from *ROSAT* and *ASCA* Observations. *A. Finoguenov, C. Jones, W. Forman, & L. David.* 514, 844 (1999)

Cosmological Magnetic Field Limits in an Inhomogeneous Universe. *Pasquale Blasi, Scott Burles, & Angela V. Olinto.* 514, L79 (1999)

Rossi X-Ray Timing Explorer Hard X-Ray Observation of Abell 754: Constraining the Hottest Temperature Component and the Intracluster Magnetic Field. *Azita Valinia, Mark J. Henriksen, Michael Lowenstein, Kurt Roettiger, Richard F. Mushotzky, & Greg Madejski.* 515, 42 (1999)

A New Measure of the Clustering of QSO Heavy-Element Absorption-Line Systems. *Jean M. Quashnock & Michael L. Stein.* 515, 506 (1999)

GALAXIES: IRREGULAR

Evolutionary Status of Dwarf "Transition" Galaxies. *Patricia M. Knezek, Kenneth R. Sembach, & John S. Gallagher III.* 514, 119 (1999)

Dark Matter and the Chemical Evolution of Irregular Galaxies. *L. Carigi, P. Colín, & M. Peimbert.* 514, 787 (1999)

GALAXIES: ISM

Properties of Galactic Outflows: Measurements of the Feedback from Star Formation. *Crystal L. Martin.* 513, 156 (1999)

Carbon in Spiral Galaxies from *Hubble Space Telescope* Spectroscopy. *D. R. Garnett, G. A. Shields, M. Peimbert, S. Torres-Peimbert, E. D. Skillman, R. J. Dufour, E. Terlevich, & R. J. Terlevich.* 513, 168 (1999)

Detection of CO (4–3), CO (9–8), and Dust Emission in the Broad Absorption Line Quasar APM 08279+5255 at a Redshift of 3.9. *D. Downes, R. Neri, T. Wiklind, D. J. Wilner, & P. A. Shaver.* 513, L1 (1999)

On the Model of Dust in the Small Magellanic Cloud. *Victor G. Zubko.* 513, L29 (1999)

The Eastern Arm of M83 Revisited: High-Resolution Mapping of ^{12}CO 1–0 Emission. *Richard J. Rand, Steven D. Lord, & James L. Higdon.* 513, 720 (1999)

Do Jet-driven Shocks Ionize the Narrow-Line Regions of Seyfert Galaxies? *A. S. Wilson & J. C. Raymond.* 513, L115 (1999)

Counterrotating Nuclear Disks in Arp 220. *K. Sakamoto, N. Z. Scoville, M. S. Yun, M. Crosas, R. Genzel, & L. J. Tacconi.* 514, 68 (1999)

Early Evolution of Disk Galaxies: Formation of Bulges in Clumpy Young Galactic Disks. *Masafumi Noguchi.* 514, 77 (1999)

On Measuring Nebular Chemical Abundances in Distant Galaxies Using Global Emission-Line Spectra. *Henry A. Kobulnicky, Robert C. Kennicutt, Jr., & James L. Pizagno.* 514, 544 (1999)

ASCA Observations of the Starburst-driven Superwind Galaxy NGC 2146: Broadband (0.6–9 keV) Spectral Properties. *Roberto Della Ceca, Richard E. Griffiths, Timothy M. Heckman, Matthew D. Lehnert, & Kimberly A. Weaver.* 514, 772 (1999)

Modeling the Radial Abundance Distribution of the Transition Galaxy NGC 1313. *Mercedes Mollá & Jean-René Roy.* 514, 781 (1999)

Supernova Remnants in the Magellanic Clouds. II. Supernova Remnant Breakouts from N11L and N86. *Rosa Murphy Williams, You-Hua Chu, John R. Dickel, R. Chris Smith, Douglas K. Milne, & P. Frank Winkler.* 514, 798 (1999)

The Efficiency of Star Formation in Galaxies as a Function of Galaxy Size and Environment. *Judith S. Young.* 514, L87 (1999)

A Supernova-regulated Interstellar Medium: Simulations of the Turbulent Multiphase Medium. *M. J. Korpi, A. Brandenburg, A. Shukurov, I. Tuominen, & Å Nordlund.* 514, L99 (1999)

On the Structure and Morphology of the "Diffuse Ionized Medium" in Star-forming Galaxies. *Jing Wang, Timothy M. Heckman, & Matthew D. Lehnert.* 515, 97 (1999)

A Reanalysis of the Ultraviolet Extinction from Interstellar Dust in the Large Magellanic Cloud. *K. A. Misselt, Geoffrey C. Clayton, & Karl D. Gordon.* 515, 128 (1999)

Small-Scale Structure at High Redshift. I. Glimpses of the Interstellar Medium at Redshift ~3.5. *Michael Rauch, Wallace L. W. Sargent, & Tom A. Barlow.* 515, 500 (1999)

Nuclear Disks of Gas and Dust in Early-Type Galaxies and the Hunt for Massive Black Holes: *Hubble Space Telescope* Observations of NGC 6251. *Laura Ferrarese & Holland C. Ford.* 515, 583 (1999)

GALAXIES: JETS

The Radio-Optical Jet in NGC 3862 from Parsec to Subkiloparsec Scales. *L. Lara, L. Feretti, G. Giovannini, S. Baum, W. D. Cotton, C. P. O'Dea, & T. Venturi.* 513, 197 (1999)

Do Jet-driven Shocks Ionize the Narrow-Line Regions of Seyfert Galaxies? *A. S. Wilson & J. C. Raymond.* 513, L115 (1999)

A Major Radio Outburst in III Zw 2 with an Extremely Inverted, Millimeter-peaked Spectrum. *Heino Falcke, Geoffrey C. Bower, Andrew P. Lobanov, Thomas P. Krichbaum, Alok R. Patnaik, Margo F. Aller, Hugh D. Aller, Harri Teräsranta, Melvyn C. H. Wright, & Göran Sandell.* 514, L17 (1999)

The Synchrotron Peak Shift during High-Energy Flares of Blazars. *Markus Böttcher.* 515, L21 (1999)

CTD 93 and the Nature of Gigahertz-peaked Spectrum Radio Sources. *David B. Shaffer, K. I. Kellermann, & T. J. Cornwell.* 515, 558 (1999)

GALAXIES: KINEMATICS AND DYNAMICS

Properties of Galactic Outflows: Measurements of the Feedback from Star Formation. *Crystal L. Martin.* 513, 156 (1999)

Large Stellar Disks in Small Elliptical Galaxies. *Hans-Walter Rix, C. Marcella Carollo, & Ken Freeman.* 513, L25 (1999)

The Cosmological Origin of the Tully-Fisher Relation. *Matthias Steinmetz & Julio F. Navarro.* 513, 555 (1999)

Maximal Disks and the Tully-Fisher Relation. *Stéphane Courteau & Hans-Walter Rix.* 513, 561 (1999)

Warped Galaxies from Misaligned Angular Momenta. *Victor P. Debattista & J. A. Sellwood.* 513, L107 (1999)

Early Evolution of Disk Galaxies: Formation of Bulges in Clumpy Young Galactic Disks. *Masafumi Noguchi.* 514, 77 (1999)

Tidal Shocking by Extended Mass Distributions. *Oleg Y. Gnedin, Lars Hernquist, & Jeremiah P. Ostriker.* 514, 109 (1999)

The Starburst-AGN Connection in Active Galaxies: The Massive Nuclear Star-forming Disk in NGC 4303. *L. Colina & S. Arribas.* 514, 637 (1999)
Evidence for a Massive Black Hole in the S0 Galaxy NGC 4342. *Nicolas Cretton & Frank C. van den Bosch.* 514, 704 (1999)
High-Velocity Clouds: Building Blocks of the Local Group. *Leo Blitz, David N. Spergel, Peter J. Teuben, Dap Hartmann, & W. Butler Burton.* 514, 818 (1999)
Substructure in Dark Halos: Orbital Eccentricities and Dynamical Friction. *Frank C. van den Bosch, Geraint F. Lewis, George Lake, & Joachim Stadel.* 515, 50 (1999)
Satellites as Probes of the Masses of Spiral Galaxies. *Lance K. Erickson, S. T. Gottesman, & James H. Hunter, Jr.* 515, 153 (1999)
Streaming Velocities as a Dynamical Estimator of Ω. *P. G. Ferreira, R. Juszkiewicz, H. A. Feldman, M. Davis, & A. H. Jaffe.* 515, L1 (1999)
Velocity Dispersion of the Gravitational Lens 0957+561. *John L. Tonry & Marijn Franx.* 515, 512 (1999)

GALAXIES: LOCAL GROUP

High-Velocity Clouds: Building Blocks of the Local Group. *Leo Blitz, David N. Spergel, Peter J. Teuben, Dap Hartmann, & W. Butler Burton.* 514, 818 (1999)

GALAXIES: LUMINOSITY FUNCTION, MASS FUNCTION

A New Assessment of the Completeness of Quasar Surveys: Implications for the Luminosity Function. *Matthew J. Graham, Roger G. Clowes, & Luis E. Campusano.* 513, 69 (1999)
Compact Nuclei in Galaxies at Moderate Redshift. II. Their Nature and Implications for the Active Galactic Nucleus Luminosity Function. *Vicki L. Sarajedini, Richard F. Green, Richard E. Griffiths, & Kavan Ratnatunga.* 514, 746 (1999)
Self-regulating Galaxy Formation as an Explanation for the Tully-Fisher Relation. *D. Elizondo, G. Yepes, R. Kates, V. Müller, & A. Klypin.* 515, 525 (1999)

GALAXIES: MAGELLANIC CLOUDS

On the Model of Dust in the Small Magellanic Cloud. *Victor G. Zubko.* 513, L29 (1999)
Supernova Remnants in the Magellanic Clouds. II. Supernova Remnant Breakouts from N11L and N86. *Rosa Murphy Williams, You-Hua Chu, John R. Dickel, R. Chris Smith, Douglas K. Milne, & P. Frank Winkler.* 514, 798 (1999)
Microlens Parallaxes with *SIRTF*. *Andrew Gould.* 514, 869 (1999)
A Reanalysis of the Ultraviolet Extinction from Interstellar Dust in the Large Magellanic Cloud. *K. A. Misselt, Geoffrey C. Clayton, & Karl D. Gordon.* 515, 128 (1999)
The Circumstellar Extinction of Planetary Nebulae. *Robin Ciardullo & George H. Jacoby.* 515, 191 (1999)

GALAXIES: NUCLEI

Megamaser Disks in Active Galactic Nuclei. *John F. Kartje, Arieh Königl, & Moshe Elitzur.* 513, 180 (1999)
High Spatial Resolution Imaging of Arp 220 from 3 to 25 Microns. *B. T. Soifer, G. Neugebauer, K. Matthews, E. E. Becklin, M. Ressler, M. W. Werner, A. J. Weinberger, & E. Egami.* 513, 207 (1999)
Multiwavelength Study of the Starburst Galaxy NGC 7714. I. Ultraviolet-Optical Spectroscopy. *Rosa M. González Delgado, María Luisa García-Vargas, Jeff Goldader, Claus Leitherer, & Anna Pasquali.* 513, 707 (1999)
The Close Environment of Seyfert Galaxies and Its Implication for Unification Models. *D. Dultzin-Hacyan, Y. Krongold, I. Fuentes-Guridi, & P. Marziani.* 513, L111 (1999)
Do Jet-driven Shocks Ionize the Narrow-Line Regions of Seyfert Galaxies? *A. S. Wilson & J. C. Raymond.* 513, L115 (1999)
Flares from the Tidal Disruption of Stars by Massive Black Holes. *Andrew Ulmer.* 514, 180 (1999)
Hydrodynamic Simulations of Counterrotating Accretion Disks. *O. A. Kuznetsov, R. V. E. Lovelace, M. M. Romanova, & V. M. Chechetkin.* 514, 691 (1999)
Evidence for a Massive Black Hole in the S0 Galaxy NGC 4342. *Nicolas Cretton & Frank C. van den Bosch.* 514, 704 (1999)
Collisional Stellar Dynamics around Massive Black Holes in Active Galactic Nuclei. *Kevin P. Rauch.* 514, 725 (1999)
Compact Nuclei in Galaxies at Moderate Redshift. II. Their Nature and Implications for the Active Galactic Nucleus Luminosity Function. *Vicki L. Sarajedini, Richard F. Green, Richard E. Griffiths, & Kavan Ratnatunga.* 514, 746 (1999)
CTD 93 and the Nature of Gigahertz-peaked Spectrum Radio Sources. *David B. Shaffer, K. I. Kellermann, & T. J. Cornwell.* 515, 558 (1999)
On Radio and X-Ray Emission Mechanisms in Nearby, X-Ray–bright Galactic Nuclei. *Insu Yi & Stephen P. Boughn.* 515, 576 (1999)
Nuclear Disks of Gas and Dust in Early-Type Galaxies and the Hunt for Massive Black Holes: *Hubble Space Telescope* Observations of NGC 6251. *Laura Ferrarese & Holland C. Ford.* 515, 583 (1999)
Polarized Broad Hα Emission from the LINER Nucleus of NGC 1052. *Aaron J. Barth, Alexei V. Filippenko, & Edward C. Moran.* 515, L61 (1999)
Thermal X-Ray Line Emission from Accreting Black Holes. *Ramesh Narayan & John Raymond.* 515, L69 (1999)

GALAXIES: PECULIAR

The Polarized Spectrum of APM 08279+5255. *Dean C. Hines, Gary D. Schmidt, & Paul S. Smith.* 514, L91 (1999)

GALAXIES: PHOTOMETRY

A New Catalog of Photometric Redshifts in the Hubble Deep Field. *Alberto Fernández-Soto, Kenneth M. Lanzetta, & Amos Yahil.* 513, 34 (1999)
A Wavelet Exploration of the Q0957+561A,B Brightness Record. *R. Schild.* 514, 598 (1999)
Hubble Space Telescope Observations of the Local Group Dwarf Galaxy Leo I. *Carme Gallart, Wendy L. Freedman, Mario Mateo, Cesare Chiosi, Ian B. Thompson, Antonio Aparicio, Gianpaolo Bertelli, Paul W. Hodge, Myung G. Lee, Edward W. Olszewski, Abhijit Saha, Peter B. Stetson, & Nicholas B. Suntzeff.* 514, 665 (1999)
Galactic Extinction from Colors and Counts of Field Galaxies in WFPC2 Frames: An Application to GRB 970228. *Rosa A. González, Andrew S. Fruchter, & Boris Dirsch.* 515, 69 (1999)
Self-regulating Galaxy Formation as an Explanation for the Tully-Fisher Relation. *D. Elizondo, G. Yepes, R. Kates, V. Müller, & A. Klypin.* 515, 525 (1999)

GALAXIES: QUASARS: ABSORPTION LINES

Determining the Fraction of Intrinsic C IV Absorption in Quasi-stellar Object Absorption-Line Systems. *Gordon T. Richards, Donald G. York, Brian Yanny, Ronald I. Kollgaard, S. A. Laurent-Muehleisen, & Daniel E. Vanden Berk.* 513, 576 (1999)
First Comparison of Ionization and Metallicity in Two Lines of Sight toward HE 1104−1805A,B at $z = 1.66$. *Sebastian Lopez, Dieter Reimers, Michael Rauch, Wallace L. W. Sargent, & Alain Smette.* 513, 598 (1999)
Cosmological Magnetic Field Limits in an Inhomogeneous Universe. *Pasquale Blasi, Scott Burles, & Angela V. Olinto.* 514, L79 (1999)
On the Origin of Damped Lyα Systems: A Case for Low Surface Brightness Galaxies? *Raul Jimenez, David V. Bowen, & Francesca Matteucci.* 514, L83 (1999)
The Lyα Forest of the Quasar in the Hubble Deep Field South. *S. Savaglio, H. C. Ferguson, T. M. Brown, B. R. Espey, K. C. Sahu, S. A. Baum, C. M. Carollo, M. E. Kaiser, M. Stiavelli, R. E. Williams, & J. Wilson.* 515, L5 (1999)
Small-Scale Structure at High Redshift. I. Glimpses of the Interstellar Medium at Redshift $\sim$3.5. *Michael Rauch, Wallace L. W. Sargent, & Tom A. Barlow.* 515, 500 (1999)
A New Measure of the Clustering of QSO Heavy-Element Absorption-Line Systems. *Jean M. Quashnock & Michael L. Stein.* 515, 506 (1999)
The $z = 1.6748$ C I Absorber toward PKS 1756+237. *Katherine C. Roth & James M. Bauer.* 515, L57 (1999)

GALAXIES: QUASARS: EMISSION LINES

Investigation of the Relation between the Spectral Energy Distributions and the Emission Lines in Low-Redshift Quasars. *Belinda J. Wilkes, Joanna Kuraszkiewicz, Paul J. Green, Smita Mathur, & Jonathan C. McDowell.* 513, 76 (1999)
A Statistical Study of Rest-Frame Optical Emission Properties in Luminous Quasars at $2.0 \leq z \leq 2.5$. *D. H. McIntosh, M. J. Rieke, H.-W. Rix, C. B. Foltz, & R. J. Weymann.* 514, 40 (1999)
Discovery of a Radio-loud/Radio-quiet Binary Quasar. *M. S. Brotherton, Michael D. Gregg, R. H. Becker, S. A. Laurent-Muehleisen, R. L. White, & S. A. Stanford.* 514, L61 (1999)
Lack of Iron Abundance Evolution in High-Redshift QSOs. *Keith L. Thompson, Gary J. Hill, & Richard Elston.* 515, 487 (1999)
The PG X-Ray QSO Sample: Links between the Ultraviolet–X-Ray Continuum and Emission Lines. *Beverley J. Wills, A. Laor, M. S. Brotherton, D. Wills, B. J. Wilkes, G. J. Ferland, & Zhaohui Shang.* 515, L53 (1999)

GALAXIES: QUASARS: GENERAL

The REX Survey: A Search for Radio-emitting X-Ray Sources. *Alessandro Caccianiga, Tommaso Maccacaro, Anna Wolter, Roberto Della Ceca, & Isabella M. Gioia.* 513, 51 (1999)

Investigation of the Relation between the Spectral Energy Distributions and the Emission Lines in Low-Redshift Quasars. *Belinda J. Wilkes, Joanna Kuraszkiewicz, Paul J. Green, Smita Mathur, & Jonathan C. McDowell.* 513, 76 (1999)

Determining the Fraction of Intrinsic C IV Absorption in Quasi-stellar Object Absorption-Line Systems. *Gordon T. Richards, Donald G. York, Brian Yanny, Ronald I. Kollgaard, S. A. Laurent-Muehleisen, & Daniel E. Vanden Berk.* 513, 576 (1999)

Gravitational Lensing as a Probe of Quintessence. *Asantha R. Cooray & Dragan Huterer.* 513, L95 (1999)

A Statistical Study of Rest-Frame Optical Emission Properties in Luminous Quasars at $2.0 \leq z \leq 2.5$. *D. H. McIntosh, M. J. Rieke, H.-W. Rix, C. B. Foltz, & R. J. Weymann.* 514, 40 (1999)

Flares from the Tidal Disruption of Stars by Massive Black Holes. *Andrew Ulmer.* 514, 180 (1999)

Formation of Quasar Nuclei in the Hearts of Ultraluminous Infrared Galaxies. *Yoshiaki Taniguchi, Satoru Ikeuchi, & Yasuhiro Shioya.* 514, L9 (1999)

A Major Radio Outburst in III Zw 2 with an Extremely Inverted, Millimeter-peaked Spectrum. *Heino Falcke, Geoffrey C. Bower, Andrew P. Lobanov, Thomas P. Krichbaum, Alok R. Patnaik, Margo F. Aller, Hugh D. Aller, Harri Teräsranta, Melvyn C. H. Wright, & Göran Sandell.* 514, L17 (1999)

Constraints from the Hubble Deep Field on High-Redshift Quasar Models. *Zoltán Haiman, Piero Madau, & Abraham Loeb.* 514, 535 (1999)

Quasar-Galaxy and AGN-Galaxy Cross-Correlations. *Héctor J. Martínez, Manuel E. Merchán, Carlos A. Valotto, & Diego G. Lambas.* 514, 558 (1999)

Ultraviolet Imaging Polarimetry of Narrow-Line Radio Galaxies. *Todd Hurt, Robert Antonucci, Ross Cohen, Anne Kinney, & Julian Krolik.* 514, 579 (1999)

Discovery of a Radio-loud/Radio-quiet Binary Quasar. *M. S. Brotherton, Michael D. Gregg, R. H. Becker, S. A. Laurent-Muehleisen, R. L. White, & S. A. Stanford.* 514, L61 (1999)

Lack of Iron Abundance Evolution in High-Redshift QSOs. *Keith L. Thompson, Gary J. Hill, & Richard Elston.* 515, 487 (1999)

No Evidence for Gamma-Ray Burst/Abell Cluster or Gamma-Ray Burst/Radio-quiet Quasar Correlations. *K. Hurley, D. H. Hartman, C. Kouveliotou, R. M. Kippen, J. Laros, T. Cline, & M. Boer.* 515, 497 (1999)

The PG X-Ray QSO Sample: Links between the Ultraviolet–X-Ray Continuum and Emission Lines. *Beverley J. Wills, A. Laor, M. S. Brotherton, D. Wills, B. J. Wilkes, G. J. Ferland, & Zhaohui Shang.* 515, L53 (1999)

GALAXIES: QUASARS: INDIVIDUAL

Name: Cloverleaf

Hubble Space Telescope Observations of the Gravitationally Lensed Cloverleaf Broad Absorption Line QSO H1413+1143: Modeling the Lens. *Kyu-Hyun Chae & David A. Turnshek.* 514, 587 (1999)

Alphanumeric: 0957+561

Velocity Dispersion of the Gravitational Lens 0957+561. *John L. Tonry & Marijn Franx.* 515, 512 (1999)

Alphanumeric: APM 08279+5255

Detection of CO (4–3), CO (9–8), and Dust Emission in the Broad Absorption Line Quasar APM 08279+5255 at a Redshift of 3.9. *D. Downes, R. Neri, T. Wiklind, D. J. Wilner, & P. A. Shaver.* 513, L1 (1999)

The Polarized Spectrum of APM 08279+5255. *Dean C. Hines, Gary D. Schmidt, & Paul S. Smith.* 514, L91 (1999)

Alphanumeric: H1413+1143

Hubble Space Telescope Observations of the Gravitationally Lensed Cloverleaf Broad Absorption Line QSO H1413+1143: Modeling the Lens. *Kyu-Hyun Chae & David A. Turnshek.* 514, 587 (1999)

Alphanumeric: HE 1104−1805AB

First Comparison of Ionization and Metallicity in Two Lines of Sight toward HE 1104−1805A,B at $z = 1.66$. *Sebastian Lopez, Dieter Reimers, Michael Rauch, Wallace L. W. Sargent, & Alain Smette.* 513, 598 (1999)

Alphanumeric: J2233−606

The Lyα Forest of the Quasar in the Hubble Deep Field South. *S. Savaglio, H. C. Ferguson, T. M. Brown, B. R. Espey, K. C. Sahu, S. A. Baum, C. M. Carollo, M. E. Kaiser, M. Stiavelli, R. E. Williams, & J. Wilson.* 515, L5 (1999)

Alphanumeric: PKS 1756+237

The $z = 1.6748$ C I Absorber toward PKS 1756+237. *Katherine C. Roth & James M. Bauer.* 515, L57 (1999)

Alphanumeric: PKS 1830−211

The Redshift of the Gravitationally Lensed Radio Source PKS 1830−211. *C. Lidman, F. Courbin, G. Meylan, T. Broadhurst, B. Frye, & W. J. W. Welch.* 514, L57 (1999)

Alphanumeric: PKS 2255−282

A Gamma-Ray Flare from PKS 2255−282. *D. J. Macomb, N. Gehrels, & C. R. Shrader.* 513, 652 (1999)

Alphanumeric: Q0957+561

A Wavelet Exploration of the Q0957+561A,B Brightness Record. *R. Schild.* 514, 598 (1999)

Alphanumeric: Q1422+231

Small-Scale Structure at High Redshift. I. Glimpses of the Interstellar Medium at Redshift ~3.5. *Michael Rauch, Wallace L. W. Sargent, & Tom A. Barlow.* 515, 500 (1999)

GALAXIES: SEYFERT

A New Assessment of the Completeness of Quasar Surveys: Implications for the Luminosity Function. *Matthew J. Graham, Roger G. Clowes, & Luis E. Campusano.* 513, 69 (1999)

Megamaser Disks in Active Galactic Nuclei. *John F. Kartje, Arieh Königl, & Moshe Elitzur.* 513, 180 (1999)

The Close Environment of Seyfert Galaxies and Its Implication for Unification Models. *D. Dultzin-Hacyan, Y. Krongold, I. Fuentes-Guridi, & P. Marziani.* 513, L111 (1999)

Do Jet-driven Shocks Ionize the Narrow-Line Regions of Seyfert Galaxies? *A. S. Wilson & J. C. Raymond.* 513, L115 (1999)

X-Ray Iron Line Reverberation from Black Hole Accretion Disks. *Christopher S. Reynolds, Andrew J. Young, Mitchell C. Begelman, & Andrew C. Fabian.* 514, 164 (1999)

A Major Radio Outburst in III Zw 2 with an Extremely Inverted, Millimeter-peaked Spectrum. *Heino Falcke, Geoffrey C. Bower, Andrew P. Lobanov, Thomas P. Krichbaum, Alok R. Patnaik, Margo F. Aller, Hugh D. Aller, Harri Teräsranta, Melvyn C. H. Wright, & Göran Sandell.* 514, L17 (1999)

Optical versus Mid-Infrared Spectroscopic Classification of Ultraluminous Infrared Galaxies. *Yoshiaki Taniguchi, Akira Yoshino, Youichi Ohyama, & Shingo Nishiura.* 514, 660 (1999)

A Cutoff in the X-Ray Fluctuation Power Density Spectrum of the Seyfert 1 Galaxy NGC 3516. *Rick Edelson & Kirpal Nandra.* 514, 682 (1999)

Broadband X-Ray Observations of the Narrow-Line X-Ray Galaxy NGC 5506. *T. Wang, T. Mihara, C. Otani, M. Matsuoka, & H. Awaki.* 515, 567 (1999)

GALAXIES: SPIRAL

Carbon in Spiral Galaxies from *Hubble Space Telescope* Spectroscopy. *D. R. Garnett, G. A. Shields, M. Peimbert, S. Torres-Peimbert, E. D. Skillman, R. J. Dufour, E. Terlevich, & R. J. Terlevich.* 513, 168 (1999)

Maximal Disks and the Tully-Fisher Relation. *Stéphane Courteau & Hans-Walter Rix.* 513, 561 (1999)

The Stellar Populations of Spiral Disks. II. Measuring and Modeling the Radial Distribution of Absorption Spectral Indices. *Mercedes Mollá, Eduardo Hardy, & Dominique Beauchamp.* 513, 695 (1999)

On Measuring Nebular Chemical Abundances in Distant Galaxies Using Global Emission-Line Spectra. *Henry A. Kobulnicky, Robert C. Kennicutt, Jr., & James L. Pizagno.* 514, 544 (1999)

The Starburst-AGN Connection in Active Galaxies: The Massive Nuclear Star-forming Disk in NGC 4303. *L. Colina & S. Arribas.* 514, 637 (1999)

Hydrodynamic Simulations of Counterrotating Accretion Disks. *O. A. Kuznetsov, R. V. E. Lovelace, M. M. Romanova, & V. M. Chechetkin.* 514, 691 (1999)

The Efficiency of Star Formation in Galaxies as a Function of Galaxy Size and Environment. *Judith S. Young.* 514, L87 (1999)

The Molecular ISM in Low Surface Brightness Disk Galaxies. *J. Christopher Mihos, Marco Spaans, & Stacy S. McGaugh.* 515, 89 (1999)

On the Structure and Morphology of the "Diffuse Ionized Medium" in Star-forming Galaxies. *Jing Wang, Timothy M. Heckman, & Matthew D. Lehnert.* 515, 97 (1999)

GALAXIES: STARBURST

Starburst-driven Mass Loss from Dwarf Galaxies: Efficiency and Metal Ejection. *Mordecai-Mark Mac Low & Andrea Ferrara.* 513, 142 (1999)

New Wolf-Rayet Galaxies with Detection of WC Stars. *J. H. Huang, Q. S. Gu, L. Ji, W. D. Li, J. Y. Wei, & W. Zheng.* 513, 215 (1999)

Radio Identification of Submillimeter Sources in the Hubble Deep Field. *E. A. Richards.* 513, L9 (1999)

The Radio-to-Submillimeter Spectral Index as a Redshift Indicator. *C. L. Carilli & Min Su Yun.* 513, L13 (1999)

Multiwavelength Study of the Starburst Galaxy NGC 7714. I. Ultraviolet-Optical Spectroscopy. *Rosa M. González Delgado, María Luisa García-Vargas, Jeff Goldader, Claus Leitherer, & Anna Pasquali.* 513, 707 (1999)

Evolutionary Synthesis Modeling of Red Supergiant Features in the Near-Infrared. *Livia Origlia, Jeffrey D. Goldader, Claus Leitherer, Daniel Schaerer, & Ernesto Oliva.* 514, 96 (1999)

Formation of Quasar Nuclei in the Hearts of Ultraluminous Infrared Galaxies. *Yoshiaki Taniguchi, Satoru Ikeuchi, & Yasuhiro Shioya.* 514, L9 (1999)

Molecular Gas in the $z = 2.565$ Submillimeter Galaxy SMM J14011+0252. *D. T. Frayer, R. J. Ivison, N. Z. Scoville, A. S. Evans, M. S. Yun, Ian Smail, A. J. Barger, A. W. Blain, & J.-P. Kneib.* 514, L13 (1999)

The Starburst-AGN Connection in Active Galaxies: The Massive Nuclear Star-forming Disk in NGC 4303. *L. Colina & S. Arribas.* 514, 637 (1999)

Optical versus Mid-Infrared Spectroscopic Classification of Ultraluminous Infrared Galaxies. *Yoshiaki Taniguchi, Akira Yoshino, Youichi Ohyama, & Shingo Nishiura.* 514, 660 (1999)

High-Resolution Infrared Spectroscopy and Nuclear Clusters in the Starburst Galaxy NGC 1614. *P. J. Puxley & P. W. J. L. Brand.* 514, 675 (1999)

ASCA Observations of the Starburst-driven Superwind Galaxy NGC 2146: Broadband (0.6–9 keV) Spectral Properties. *Roberto Della Ceca, Richard E. Griffiths, Timothy M. Heckman, Matthew D. Lehnert, & Kimberly A. Weaver.* 514, 772 (1999)

The PG X-Ray QSO Sample: Links between the Ultraviolet–X-Ray Continuum and Emission Lines. *Beverley J. Wills, A. Laor, M. S. Brotherton, D. Wills, B. J. Wilkes, G. J. Ferland, & Zhaohui Shang.* 515, L53 (1999)

GALAXIES: STAR CLUSTERS

The Globular Cluster System in the Inner Region of M87. *Arunav Kundu, Bradley C. Whitmore, William B. Sparks, F. Duccio Macchetto, Stephen E. Zepf, & Keith M. Ashman.* 513, 733 (1999)

Tidal Shocking by Extended Mass Distributions. *Oleg Y. Gnedin, Lars Hernquist, & Jeremiah P. Ostriker.* 514, 109 (1999)

Formation of Quasar Nuclei in the Hearts of Ultraluminous Infrared Galaxies. *Yoshiaki Taniguchi, Satoru Ikeuchi, & Yasuhiro Shioya.* 514, L9 (1999)

The Color Distributions of Globular Clusters in Virgo Elliptical Galaxies. *Eric H. Neilsen, Jr., & Zlatan I. Tsvetanov.* 515, L13 (1999)

Objects in NGC 205 Resolved into Stellar Associations by *Hubble Space Telescope* Ultraviolet Imaging. *Michele Cappellari, Francesco Bertola, David Burstein, Lucio M. Buson, Laura Greggio, & Alvio Renzini.* 515, L17 (1999)

GALAXIES: STATISTICS

A New Catalog of Photometric Redshifts in the Hubble Deep Field. *Alberto Fernández-Soto, Kenneth M. Lanzetta, & Amos Yahil.* 513, 34 (1999)

How Dark Matter Halos Cluster in Lagrangian Space. *Cristiano Porciani, Paolo Catelan, & Cedric Lacey.* 513, L99 (1999)

The Close Environment of Seyfert Galaxies and Its Implication for Unification Models. *D. Dultzin-Hacyan, Y. Krongold, I. Fuentes-Guridi, & P. Marziani.* 513, L111 (1999)

Weakly Nonlinear Clustering for Arbitrary Expansion Histories. *Marc Kamionkowski & Ari Buchalter.* 514, 7 (1999)

Gravitational Lensing and Dark Structures. *Yu-Chung N. Cheng & Lawrence M. Krauss.* 514, 25 (1999)

Fractal Correlations in the CfA2–South Redshift Survey. *M. Joyce, M. Montuori, & F. Sylos Labini.* 514, L5 (1999)

Biasing and High-Order Statistics from the Southern-Sky Redshift Survey. *C. Benoist, A. Cappi, L. N. da Costa, S. Maurogordato, F. R. Bouchet, & R. Schaeffer.* 514, 563 (1999)

Galactic Extinction from Colors and Counts of Field Galaxies in WFPC2 Frames: An Application to GRB 970228. *Rosa A. González, Andrew S. Fruchter, & Boris Dirsch.* 515, 69 (1999)

Cumulant Correlators from the APM. *István Szapudi & Alexander S. Szalay.* 515, L43 (1999) (Orig. paper in 481, L1 (1997))

The Canada-UK Deep Submillimeter Survey: First Submillimeter Images, the Source Counts, and Resolution of the Background. *Stephen Eales, Simon Lilly, Walter Gear, Loretta Dunne, J. Richard Bond, Francois Hammer, Olivier Le Fèvre, & David Crampton.* 515, 518 (1999)

GALAXIES: STELLAR CONTENT

Stellar Populations in Gas-rich Galaxy Mergers. II. Feedback Effects of Type Ia and Type II Supernovae. *Kenji Bekki & Yasuhiro Shioya.* 513, 108 (1999)

The Ultraviolet Upturn in Elliptical Galaxies as an Age Indicator. *Sukyoung Yi, Young-Wook Lee, Jong-Hak Woo, Jang-Hyun Park, Pierre Demarque, & Augustus Oemler, Jr.* 513, 128 (1999)

Starburst-driven Mass Loss from Dwarf Galaxies: Efficiency and Metal Ejection. *Mordecai-Mark Mac Low & Andrea Ferrara.* 513, 142 (1999)

Evolutionary Stellar Population Synthesis at 2 Å Spectral Resolution. *A. Vazdekis.* 513, 224 (1999)

The Stellar Populations of Spiral Disks. II. Measuring and Modeling the Radial Distribution of Absorption Spectral Indices. *Mercedes Mollá, Eduardo Hardy, & Dominique Beauchamp.* 513, 695 (1999)

Multiwavelength Study of the Starburst Galaxy NGC 7714. I. Ultraviolet-Optical Spectroscopy. *Rosa M. González Delgado, María Luisa García-Vargas, Jeff Goldader, Claus Leitherer, & Anna Pasquali.* 513, 707 (1999)

Evolutionary Synthesis Modeling of Red Supergiant Features in the Near-Infrared. *Livia Origlia, Jeffrey D. Goldader, Claus Leitherer, Daniel Schaerer, & Ernesto Oliva.* 514, 96 (1999)

Hubble Space Telescope Observations of the Local Group Dwarf Galaxy Leo I. *Carme Gallart, Wendy L. Freedman, Mario Mateo, Cesare Chiosi, Ian B. Thompson, Antonio Aparicio, Gianpaolo Bertelli, Paul W. Hodge, Myung G. Lee, Edward W. Olszewski, Abhijit Saha, Peter B. Stetson, & Nicholas B. Suntzeff.* 514, 665 (1999)

High-Resolution Infrared Spectroscopy and Nuclear Clusters in the Starburst Galaxy NGC 1614. *P. J. Puxley & P. W. J. L. Brand.* 514, 675 (1999)

Stellar Metallicities and Type Ia Supernova Rates in the Early-Type Galaxy NGC 5846 from *ROSAT* and *ASCA* Observations. *A. Finoguenov, C. Jones, W. Forman, & L. David.* 514, 844 (1999)

On the Origin of Damped Lyα Systems: A Case for Low Surface Brightness Galaxies? *Raul Jimenez, David V. Bowen, & Francesca Matteucci.* 514, L83 (1999)

Detection of Surface Brightness Fluctuations in NGC 4373 Using the *Hubble Space Telescope*. *Michael A. Pahre, Jeremy R. Mould, Alan Dressler, Jon A. Holtzman, Alan M. Watson, John S. Gallagher III, Gilda E. Ballester, Christopher J. Burrows, Stefano Casertano, John T. Clarke, David Crisp, Richard E. Griffiths, Carl J. Grillmair, J. Jeff Hester, John G. Hoessel, Paul A. Scowen, Karl R. Stapelfeldt, John T. Trauger, & James A. Westphal.* 515, 79 (1999)

A Comparison of Metal Enrichment Histories in Rich Clusters and Individual Luminous Elliptical Galaxies. *Fabrizio Brighenti & William G. Mathews.* 515, 542 (1999)

GALAXIES: STRUCTURE

Stellar Populations in Gas-rich Galaxy Mergers. II. Feedback Effects of Type Ia and Type II Supernovae. *Kenji Bekki & Yasuhiro Shioya.* 513, 108 (1999)

High Spatial Resolution Imaging of Arp 220 from 3 to 25 Microns. *B. T. Soifer, G. Neugebauer, K. Matthews, E. E. Becklin, M. Ressler, M. W. Werner, A. J. Weinberger, & E. Egami.* 513, 207 (1999)

Relativistic and Newtonian Core-Shell Models: Analytical and Numerical Results. *Werner M. Vieira & Patricio S. Letelier.* 513, 383 (1999)

Large Stellar Disks in Small Elliptical Galaxies. *Hans-Walter Rix, C. Marcella Carollo, & Ken Freeman.* 513, L25 (1999)

Maximal Disks and the Tully-Fisher Relation. *Stéphane Courteau & Hans-Walter Rix.* 513, 561 (1999)

The Eastern Arm of M83 Revisited: High-Resolution Mapping of ^{12}CO 1–0 Emission. *Richard J. Rand, Steven D. Lord, & James L. Higdon.* 513, 720 (1999)

Warped Galaxies from Misaligned Angular Momenta. *Victor P. Debattista & J. A. Sellwood.* 513, L107 (1999)

Early Evolution of Disk Galaxies: Formation of Bulges in Clumpy Young Galactic Disks. *Masafumi Noguchi.* 514, 77 (1999)

Evidence for a Massive Black Hole in the S0 Galaxy NGC 4342. *Nicolas Cretton & Frank C. van den Bosch.* 514, 704 (1999)

Substructure in Dark Halos: Orbital Eccentricities and Dynamical Friction. *Frank C. van den Bosch, Geraint F. Lewis, George Lake, & Joachim Stadel.* 515, 50 (1999)

The Molecular ISM in Low Surface Brightness Disk Galaxies. *J. Christopher Mihos, Marco Spaans, & Stacy S. McGaugh.* 515, 89 (1999)

GALAXY: ABUNDANCES

The Earliest Phases of Galaxy Evolution. *Cristina Chiappini, Francesca Matteucci, Timothy C. Beers, & Ken'ichi Nomoto.* 515, 226 (1999)

GALAXY: CENTER

Smoothed Particle Hydrodynamic Simulations of Galactic Gaseous Disk with Bar: Distribution and Kinematic Structure of Molecular Clouds toward the Galactic Center. *C. W. Lee, H. M. Lee, H. B. Ann, & K. H. Kwon.* 513, 242 (1999)

Infalling Gas toward the Galactic Center. *Alison L. Coil & Paul T. P. Ho.* 513, 752 (1999)

Flares from the Tidal Disruption of Stars by Massive Black Holes. *Andrew Ulmer.* 514, 180 (1999)

Massive Stars in the Quintuplet Cluster. *Donald F. Figer, Ian S. McLean, & Mark Morris.* 514, 202 (1999)

G359.87+0.18, An FR II Radio Galaxy 15′ from Sagittarius A*: Implications for the Scattering Region in the Galactic Center. *T. Joseph W. Lazio, K. R. Anantharamaiah, W. M. Goss, Namir E. Kassim, & James M. Cordes.* 515, 196 (1999)

Gamma-Ray Emission from the Inner Galactic Ridge. *R. L. Kinzer, W. R. Purcell, & J. D. Kurfess.* 515, 215 (1999)

A High-Velocity Molecular Cloud near the Center of the Galaxy. *Tomoharu Oka, Glenn J. White, Tetsuo Hasegawa, Fumio Sato, Masato Tsuboi, & Atsushi Miyazaki.* 515, 249 (1999)

Thermal X-Ray Line Emission from Accreting Black Holes. *Ramesh Narayan & John Raymond.* 515, L69 (1999)

GALAXY: EVOLUTION

The Earliest Phases of Galaxy Evolution. *Cristina Chiappini, Francesca Matteucci, Timothy C. Beers, & Ken'ichi Nomoto.* 515, 226 (1999)

Testing the Relation between the Local and Cosmic Star Formation Histories. *Brian D. Fields.* 515, 603 (1999)

GALAXY: FORMATION

Mass Condensation on Proto–Globular Clusters of the Two-Component Protogalaxy. *Hideyuki Kamaya.* 514, L21 (1999)

GALAXY: GLOBULAR CLUSTERS: GENERAL

Hubble Space Telescope Observations of the Central-Cusp Globular Cluster NGC 6752: the Effect of Binary Stars on the Luminosity Function in the Core. *Eric P. Rubenstein & Charles D. Bailyn.* 513, L33 (1999)

Stellar Envelope Convection Calibrated by Radiation Hydrodynamics Simulations: Influence on Globular Cluster Isochrones. *Bernd Freytag & Maurizio Salaris.* 513, L49 (1999)

On the Self-consistent Response of Stellar Systems to Gravitational Shocks. *Oleg Y. Gnedin & Jeremiah P. Ostriker.* 513, 626 (1999)

The Mode Change of the RR Lyrae Variable V79 in M3. *Christine M. Clement & Vitaly P. Goranskij.* 513, 767 (1999)

Mass Condensation on Proto–Globular Clusters of the Two-Component Protogalaxy. *Hideyuki Kamaya.* 514, L21 (1999)

Substructure in Dark Halos: Orbital Eccentricities and Dynamical Friction. *Frank C. van den Bosch, Geraint F. Lewis, George Lake, & Joachim Stadel.* 515, 50 (1999)

The Color Distributions of Globular Clusters in Virgo Elliptical Galaxies. *Eric H. Neilsen, Jr., & Zlatan I. Tsvetanov.* 515, L13 (1999)

GALAXY: GLOBULAR CLUSTERS: INDIVIDUAL

Messier Number: M3

The RR Lyrae Period-Amplitude Relation as a Clue to the Origin of the Oosterhoff Dichotomy. *Christine M. Clement & Ian Shelton.* 515, L85 (1999)

Messier Number: M4

The RR Lyrae Period-Amplitude Relation as a Clue to the Origin of the Oosterhoff Dichotomy. *Christine M. Clement & Ian Shelton.* 515, L85 (1999)

Messier Number: M5

The RR Lyrae Period-Amplitude Relation as a Clue to the Origin of the Oosterhoff Dichotomy. *Christine M. Clement & Ian Shelton.* 515, L85 (1999)

Messier Number: M9

The RR Lyrae Period-Amplitude Relation as a Clue to the Origin of the Oosterhoff Dichotomy. *Christine M. Clement & Ian Shelton.* 515, L85 (1999)

Messier Number: M68

The RR Lyrae Period-Amplitude Relation as a Clue to the Origin of the Oosterhoff Dichotomy. *Christine M. Clement & Ian Shelton.* 515, L85 (1999)

Messier Number: M92

The RR Lyrae Period-Amplitude Relation as a Clue to the Origin of the Oosterhoff Dichotomy. *Christine M. Clement & Ian Shelton.* 515, L85 (1999)

Messier Number: M107

The RR Lyrae Period-Amplitude Relation as a Clue to the Origin of the Oosterhoff Dichotomy. *Christine M. Clement & Ian Shelton.* 515, L85 (1999)

NGC Number: NGC 1818

On the Nature of the Peculiar Hot Star in the Young Large Magellanic Cloud Cluster NGC 1818. *James Liebert.* 514, L25 (1999)

NGC Number: NGC 6624

Evolutionary Stellar Population Synthesis at 2 Å Spectral Resolution. *A. Vazdekis.* 513, 224 (1999)

NGC Number: NGC 6752

Hubble Space Telescope Observations of the Central-Cusp Globular Cluster NGC 6752: the Effect of Binary Stars on the Luminosity Function in the Core. *Eric P. Rubenstein & Charles D. Bailyn.* 513, L33 (1999)

Name: 47 Tucanae

Evolutionary Stellar Population Synthesis at 2 Å Spectral Resolution. *A. Vazdekis.* 513, 224 (1999)

GALAXY: HALO

Is Galactic Dark Matter White? *G. Chabrier.* 513, L103 (1999)

Microlens Parallaxes with *SIRTF*. *Andrew Gould.* 514, 869 (1999)

Highly Ionized High-Velocity Clouds: Intergalactic Gas in the Local Group or Distant Gas in the Galactic Halo? *Kenneth R. Sembach, Blair D. Savage, Limin Lu, & Edward M. Murphy.* 515, 108 (1999)

GALAXY: OPEN CLUSTERS AND ASSOCIATIONS: INDIVIDUAL

Name: Hyades

A Precision Test of *Hipparcos* Systematics toward the Hyades. *Vijay K. Narayanan & Andrew Gould.* 515, 256 (1999)

Name: Quintuplet cluster

Massive Stars in the Quintuplet Cluster. *Donald F. Figer, Ian S. McLean, & Mark Morris.* 514, 202 (1999)

GALAXY: STELLAR CONTENT

Is Galactic Dark Matter White? *G. Chabrier.* 513, L103 (1999)

Microlensing in the Galactic Bulge: Effects of the Disk behind the Bulge. *Vibhat Nair & Jordi Miralda-Escudé.* 515, 206 (1999)

GALAXY: STRUCTURE

Microlensing in the Galactic Bulge: Effects of the Disk behind the Bulge. *Vibhat Nair & Jordi Miralda-Escudé.* 515, 206 (1999)

Gamma-Ray Emission from the Inner Galactic Ridge. *R. L. Kinzer, W. R. Purcell, & J. D. Kurfess.* 515, 215 (1999)

GAMMA RAYS: BURSTS

Short-Timescale Variability in the External Shock Model of Gamma-Ray Bursts. *Charles D. Dermer & Kurt E. Mitman.* 513, L5 (1999)

Fireball Loading and the Blast-Wave Model of Gamma-Ray Bursts. *Charles D. Dermer, James Chiang, & Markus Böttcher.* 513, 656 (1999)

Hydrodynamics of a Relativistic Fireball: The Complete Evolution. *Shiho Kobayashi, Tsvi Piran, & Re'em Sari.* 513, 669 (1999)

Images and Spectra from the Interior of a Relativistic Fireball. *Jonathan Granot, Tsvi Piran, & Re'em Sari.* 513, 679 (1999)

Radio and X-Ray Observations of the 1998 Outburst of the Recurrent X-Ray Transient 4U 1630−47. *R. M. Hjellming, M. P. Rupen, A. J. Mioduszewski, E. Kuulkers, M. McCollough, B. A. Harmon, M. Buxton,*

R. Sood, A. Tzioumis, D. Rayner, S. Dieters, & P. Durouchoux. 514, 383 (1999)

Time-integrated Gamma-Ray Burst Synchrotron Spectra from Blast-Wave/Cloud Interactions. *James Chiang.* 514, 856 (1999)

A Statistical Treatment of the Gamma-Ray Burst "No Host Galaxy" Problem. II. Energies of Standard Candle Bursts. *David L. Band, Dieter H. Hartmann, & Bradley E. Schaefer.* 514, 862 (1999)

The X-Ray Afterglow of the Gamma-Ray Burst of 1997 May 8: Spectral Variability and Possible Evidence of an Iron Line. *L. Piro, E. Costa, M. Feroci, F. Frontera, L. Amati, D. Dal Fiume, L. A. Antonelli, J. Heise, J. in 't Zand, A. Owens, A. N. Parmar, G. Cusumano, M. Vietri, & G. C. Perola.* 514, L73 (1999)

Galactic Extinction from Colors and Counts of Field Galaxies in WFPC2 Frames: An Application to GRB 970228. *Rosa A. González, Andrew S. Fruchter, & Boris Dirsch.* 515, 69 (1999)

A Giant Outburst from SGR 1900+14 Observed with the *BeppoSAX* Gamma-Ray Burst Monitor. *M. Feroci, F. Frontera, E. Costa, L. Amati, M. Tavani, M. Rapisarda, & M. Orlandini.* 515, L9 (1999)

No Evidence for Gamma-Ray Burst/Abell Cluster or Gamma-Ray Burst/Radio-quiet Quasar Correlations. *K. Hurley, D. H. Hartman, C. Kouveliotou, R. M. Kippen, J. Laros, T. Cline, & M. Boer.* 515, 497 (1999)

A Subrelativistic Shock Model for the Radio Emission of SN 1998bw. *Eli Waxman & Abraham Loeb.* 515, 721 (1999)

The External Shock Model of Gamma-Ray Bursts: Three Predictions and a Paradox Resolved. *Charles D. Dermer, Markus Böttcher, & James Chiang.* 515, L49 (1999)

GAMMA RAYS: OBSERVATIONS

Very High Energy Gamma Rays from PKS 2155−304. *P. M. Chadwick, K. Lyons, T. J. L. McComb, K. J. Orford, J. L. Osborne, S. M. Rayner, S. E. Shaw, K. E. Turver, & G. J. Wieczorek.* 513, 161 (1999)

A Gamma-Ray Flare from PKS 2255−282. *D. J. Macomb, N. Gehrels, & C. R. Shrader.* 513, 652 (1999)

High-Energy Emission from the TeV Blazar Markarian 501 during Multiwavelength Observations in 1996. *J. Kataoka, J. R. Mattox, J. Quinn, H. Kubo, F. Makino, T. Takahashi, S. Inoue, R. C. Hartman, G. M. Madejski, P. Sreekumar, & S. J. Wagner.* 514, 138 (1999)

The Progenitor of the New COMPTEL/*ROSAT* Supernova Remnant in Vela. *Wan Chen & Neil Gehrels.* 514, L103 (1999)

Gamma-Ray Emission from the Inner Galactic Ridge. *R. L. Kinzer, W. R. Purcell, & J. D. Kurfess.* 515, 215 (1999)

The "Rabbit": A Potential Radio Counterpart of GeV J1417−6100. *Mallory S. E. Roberts, Roger W. Romani, Simon Johnston, & Anne J. Green.* 515, 712 (1999)

GAMMA RAYS: THEORY

Radio to Gamma-Ray Emission from Shell-Type Supernova Remnants: Predictions from Nonlinear Shock Acceleration Models. *Matthew G. Baring, Donald C. Ellison, Stephen P. Reynolds, Isabelle A. Grenier, & Philippe Goret.* 513, 311 (1999)

Images and Spectra from the Interior of a Relativistic Fireball. *Jonathan Granot, Tsvi Piran, & Re'em Sari.* 513, 679 (1999)

The External Shock Model of Gamma-Ray Bursts: Three Predictions and a Paradox Resolved. *Charles D. Dermer, Markus Böttcher, & James Chiang.* 515, L49 (1999)

GRAVITATION

Cosmic Microwave Background Anisotropies in the Cold Dark Matter Model: A Covariant and Gauge-invariant Approach. *Anthony Challinor & Anthony Lasenby.* 513, 1 (1999)

Frame Dragging and Other Precessional Effects in Black Hole Pulsar Binaries. *N. Wex & S. M. Kopeikin.* 514, 388 (1999)

Evidence for Antipodal Hot Spots during X-Ray Bursts from 4U 1636−536. *M. Coleman Miller.* 515, L77 (1999)

HYDRODYNAMICS

Starburst-driven Mass Loss from Dwarf Galaxies: Efficiency and Metal Ejection. *Mordecai-Mark Mac Low & Andrea Ferrara.* 513, 142 (1999)

Dynamical Friction in a Gaseous Medium. *Eve C. Ostriker.* 513, 252 (1999)

Dynamics of Plasma Close to the Horizon of a Schwarzschild Black Hole. *Wenchien Chou & Toshiki Tajima.* 513, 401 (1999)

Hydrodynamics of a Relativistic Fireball: The Complete Evolution. *Shiho Kobayashi, Tsvi Piran, & Re'em Sari.* 513, 669 (1999)

Images and Spectra from the Interior of a Relativistic Fireball. *Jonathan Granot, Tsvi Piran, & Re'em Sari.* 513, 679 (1999)

Rossby Wave Instability of Keplerian Accretion Disks. *R. V. E. Lovelace, H. Li, S. A. Colgate, & A. F. Nelson.* 513, 805 (1999)

On the Azimuthal Structure of Thermal Convection in Circumstellar Disks. *H. H. Klahr, Th. Henning, & W. Kley.* 514, 325 (1999)

Tidally Induced Gap Formation in Protostellar Disks: Gap Clearing and Suppression of Protoplanetary Growth. *G. Bryden, Xingming Chen, D. N. C. Lin, Richard P. Nelson, & John C. B. Papaloizou.* 514, 344 (1999)

Hydrodynamic Simulations of Counterrotating Accretion Disks. *O. A. Kuznetsov, R. V. E. Lovelace, M. M. Romanova, & V. M. Chechetkin.* 514, 691 (1999)

On the Mass of Population III Stars. *Fumitaka Nakamura & Masayuki Umemura.* 515, 239 (1999)

Self-regulating Galaxy Formation as an Explanation for the Tully-Fisher Relation. *D. Elizondo, G. Yepes, R. Kates, V. Müller, & A. Klypin.* 515, 525 (1999)

Accretion Disk Reversal and the Spin-up/Spin-down of Accreting Pulsars. *James R. Murray, Martijn de Kool, & Jianke Li.* 515, 738 (1999)

The Effect of an Isothermal Atmosphere on the Propagation of Three-dimensional Waves in a Thermally Stratified Accretion Disk. *G. I. Ogilvie & S. H. Lubow.* 515, 767 (1999)

INFRARED: GALAXIES

High Spatial Resolution Imaging of Arp 220 from 3 to 25 Microns. *B. T. Soifer, G. Neugebauer, K. Matthews, E. E. Becklin, M. Ressler, M. W. Werner, A. J. Weinberger, & E. Egami.* 513, 207 (1999)

The Radio-to-Submillimeter Spectral Index as a Redshift Indicator. *C. L. Carilli & Min Su Yun.* 513, L13 (1999)

A Narrowband Imaging Search for [O III] Emission from Galaxies at $z > 3$. *Harry I. Teplitz, Matthew A. Malkan, & Ian S. McLean.* 514, 33 (1999)

Evolutionary Synthesis Modeling of Red Supergiant Features in the Near-Infrared. *Livia Origlia, Jeffrey D. Goldader, Claus Leitherer, Daniel Schaerer, & Ernesto Oliva.* 514, 96 (1999)

Formation of Quasar Nuclei in the Hearts of Ultraluminous Infrared Galaxies. *Yoshiaki Taniguchi, Satoru Ikeuchi, & Yasuhiro Shioya.* 514, L9 (1999)

Optical versus Mid-Infrared Spectroscopic Classification of Ultraluminous Infrared Galaxies. *Yoshiaki Taniguchi, Akira Yoshino, Youichi Ohyama, & Shingo Nishiura.* 514, 660 (1999)

High-Resolution Infrared Spectroscopy and Nuclear Clusters in the Starburst Galaxy NGC 1614. *P. J. Puxley & P. W. J. L. Brand.* 514, 675 (1999)

The Polarized Spectrum of APM 08279+5255. *Dean C. Hines, Gary D. Schmidt, & Paul S. Smith.* 514, L91 (1999)

The Canada-UK Deep Submillimeter Survey: First Submillimeter Images, the Source Counts, and Resolution of the Background. *Stephen Eales, Simon Lilly, Walter Gear, Loretta Dunne, J. Richard Bond, Francois Hammer, Olivier Le Fèvre, & David Crampton.* 515, 518 (1999)

INFRARED: GENERAL

A Statistical Study of Rest-Frame Optical Emission Properties in Luminous Quasars at $2.0 \leq z \leq 2.5$. *D. H. McIntosh, M. J. Rieke, H.-W. Rix, C. B. Foltz, & R. J. Weymann.* 514, 40 (1999)

INFRARED: ISM: CONTINUUM

Submillimeter Continuum Emission in the ρ Ophiuchi Molecular Cloud: Filaments, Arcs, and an Unidentified Far-Infrared Object. *Christine D. Wilson, Lorne W. Avery, Michel Fich, Doug Johnstone, Gilles Joncas, Lewis B. G. Knee, Henry E. Matthews, George F. Mitchell, Gerald H. Moriarty-Schieven, & Ralph E. Pudritz.* 513, L139 (1999)

INFRARED: ISM: LINES AND BANDS

The Interstellar 4.62 Micron Band. *Y. J. Pendleton, A. G. G. M. Tielens, A. T. Tokunaga, & M. P. Bernstein.* 513, 294 (1999)

Direct Spectroscopic Evidence for Ionized Polycyclic Aromatic Hydrocarbons in the Interstellar Medium. *G. C. Sloan, T. L. Hayward, L. J. Allamandola, J. D. Bregman, B. DeVito, & D. M. Hudgins.* 513, L65 (1999)

The Spacing of the Interstellar 6.2 and 7.7 Micron Emission Features as an Indicator of Polycyclic Aromatic Hydrocarbon Size. *Douglas M. Hudgins & L. J. Allamandola.* 513, L69 (1999)

The SiC Problem: Astronomical and Meteoritic Evidence. *A. K. Speck, A. M. Hofmeister, & M. J. Barlow.* 513, L87 (1999)

Water Ice, Silicate, and Polycyclic Aromatic Hydrocarbon Emission Features in the *Infrared Space Observatory* Spectrum of the Carbon-rich Planetary Nebula CPD −56°8032. *Martin Cohen, M. J. Barlow, R. J. Sylvester, X.-W. Liu, P. Cox, T. Lim, B. Schmitt, & A. K. Speck.* 513, L135 (1999)

Infrared Space Observatory–Long Wavelength Spectrometer Detection of the 112 Micron HD $J = 1 \rightarrow 0$ Line toward the Orion Bar. *Christopher M.*

Wright, Ewine F. van Dishoeck, Pierre Cox, Sunil D. Sidher, & Martin F. Kessler. 515, L29 (1999)

Theoretical Modeling of *ISO* Results on Planetary Nebula NGC 7027. *Min Yan, S. R. Federman, A. Dalgarno, & J. E. Bjorkman.* 515, 640 (1999)

INFRARED: SOLAR SYSTEM

Detection of the Methyl Radical on Neptune. *B. Bézard, P. N. Romani, H. Feuchtgruber, & T. Encrenaz.* 515, 868 (1999)

INFRARED: STARS

The SiC Problem: Astronomical and Meteoritic Evidence. *A. K. Speck, A. M. Hofmeister, & M. J. Barlow.* 513, L87 (1999)

Discovery of Two New, Carbon-rich Proto–Planetary Nebulae: IRAS Z02229+6208 and IRAS 07430+1115. *Bruce J. Hrivnak & Sun Kwok.* 513, 869 (1999)

Reflected Spectra and Albedos of Extrasolar Giant Planets. I. Clear and Cloudy Atmospheres. *Mark S. Marley, Christopher Gelino, Denise Stephens, Jonathan I. Lunine, & Richard Freedman.* 513, 879 (1999)

Infrared Space Observatory Observations of IRAS 16594−4656: A New Proto–Planetary Nebula with a Strong 21 Micron Dust Feature. *Pedro García-Lario, Arturo Manchado, Ana Ulla, & Minia Manteiga.* 513, 941 (1999)

NICMOS Imaging of the HR 4796A Circumstellar Disk. *Glenn Schneider, Bradford A. Smith, E. E. Becklin, David W. Koerner, Roland Meier, Dean C. Hines, Patrick J. Lowrance, Richard J. Terrile, Rodger I. Thompson, & Marcia Rieke.* 513, L127 (1999)

Sub–Astronomical Unit Structure of the Near-Infrared Emission from AB Aurigae. *R. Millan-Gabet, F. P. Schloerb, W. A. Traub, F. Malbet, J. P. Berger, & J. D. Bregman.* 513, L131 (1999)

L1448 IRS 2: A HIRES-identified Class 0 Protostar. *JoAnn O'Linger, Grace Wolf-Chase, Mary Barsony, & Derek Ward-Thompson.* 515, 696 (1999)

Dust around First-Ascent Red Giants. *M. Jura.* 515, 706 (1999)

INSTABILITIES

Rossby Wave Instability of Keplerian Accretion Disks. *R. V. E. Lovelace, H. Li, S. A. Colgate, & A. F. Nelson.* 513, 805 (1999)

A Population of Faint Nontransient Low-Mass Black Hole Binaries. *Kristen Menou, Ramesh Narayan, & Jean-Pierre Lasota.* 513, 811 (1999)

A Multidimensional Code for Isothermal Magnetohydrodynamic Flows in Astrophysics. *Jongsoo Kim, Dongsu Ryu, T. W. Jones, & Seung Soo Hong.* 514, 506 (1999)

Wind Inhomogeneities in Wolf-Rayet Stars. II. Investigation of Emission-Line Profile Variations. *Sébastien Lépine & Anthony F. J. Moffat.* 514, 909 (1999)

Magnetorotational Instability in Protoplanetary Disks. I. On the Global Stability of Weakly Ionized Disks with Ohmic Dissipation. *Takayoshi Sano & Shoken M. Miyama.* 515, 776 (1999)

INTERPLANETARY MEDIUM

A Markov Stochastic Process Theory of Cosmic-Ray Modulation. *Ming Zhang.* 513, 409 (1999)

Comparison between Multisphere Light-scattering Calculations: Rigorous Solution and Discrete-Dipole Approximation. *Yu-lin Xu & Bo Å. S. Gustafson.* 513, 894 (1999)

ISM: ABUNDANCES

A Semianalytical Model for the Observational Properties of the Dominant Carbon Species at Different Metallicities. *Alberto D. Bolatto, James M. Jackson, & James G. Ingalls.* 513, 275 (1999)

On Measuring Nebular Chemical Abundances in Distant Galaxies Using Global Emission-Line Spectra. *Henry A. Kobulnicky, Robert C. Kennicutt, Jr., & James L. Pizagno.* 514, 544 (1999)

Highly Ionized High-Velocity Clouds: Intergalactic Gas in the Local Group or Distant Gas in the Galactic Halo? *Kenneth R. Sembach, Blair D. Savage, Limin Lu, & Edward M. Murphy.* 515, 108 (1999)

Correlation between Gas and Dust in Molecular Clouds. *João Alves, Charles J. Lada, & Elizabeth A. Lada.* 515, 265 (1999)

Infrared Space Observatory–Long Wavelength Spectrometer Detection of the 112 Micron HD $J = 1 \rightarrow 0$ Line toward the Orion Bar. *Christopher M. Wright, Ewine F. van Dishoeck, Pierre Cox, Sunil D. Sidher, & Martin F. Kessler.* 515, L29 (1999)

The $z = 1.6748$ C I Absorber toward PKS 1756+237. *Katherine C. Roth & James M. Bauer.* 515, L57 (1999)

ISM: ATOMS

Extended Dust Emission and Atomic Hydrogen: A Reservoir of Diffuse H_2 in NGC 1068. *Padeli P. Papadopoulos & E. R. Seaquist.* 514, L95 (1999)

ISM: CLOUDS

Smoothed Particle Hydrodynamic Simulations of Galactic Gaseous Disk with Bar: Distribution and Kinematic Structure of Molecular Clouds toward the Galactic Center. *C. W. Lee, H. M. Lee, H. B. Ann, & K. H. Kwon.* 513, 242 (1999)

New H and H_2 Reactions with Small Hydrocarbon Ions and Their Roles in Benzene Synthesis in Dense Interstellar Clouds. *Murray J. McEwan, Graham B. I. Scott, Nigel G. Adams, Lucia M. Babcock, R. Terzieva, & Eric Herbst.* 513, 287 (1999)

The Interstellar 4.62 Micron Band. *Y. J. Pendleton, A. G. G. M. Tielens, A. T. Tokunaga, & M. P. Bernstein.* 513, 294 (1999)

JCMT Observations of Cometary Clouds in the Galactic Chimney near W4. *A. R. Taylor, Judith A. Irwin, Henry E. Matthews, & Mark H. Heyer.* 513, 339 (1999)

Infalling Gas toward the Galactic Center. *Alison L. Coil & Paul T. P. Ho.* 513, 752 (1999)

Mass Condensation on Proto–Globular Clusters of the Two-Component Protogalaxy. *Hideyuki Kamaya.* 514, L21 (1999)

Detection of the CN Zeeman Effect in Molecular Clouds. *Richard M. Crutcher, Thomas H. Troland, Bernard Lazareff, Gebriel Paubert, & Ilya Kazès.* 514, L121 (1999)

Highly Ionized High-Velocity Clouds: Intergalactic Gas in the Local Group or Distant Gas in the Galactic Halo? *Kenneth R. Sembach, Blair D. Savage, Limin Lu, & Edward M. Murphy.* 515, 108 (1999)

On the Mass of Population III Stars. *Fumitaka Nakamura & Masayuki Umemura.* 515, 239 (1999)

A High-Velocity Molecular Cloud near the Center of the Galaxy. *Tomoharu Oka, Glenn J. White, Tetsuo Hasegawa, Fumio Sato, Masato Tsuboi, & Atsushi Miyazaki.* 515, 249 (1999)

The Magnetic Field of the NGC 2024 Molecular Cloud. *R. M. Crutcher, D. A. Roberts, T. H. Troland, & W. M. Goss.* 515, 275 (1999)

Clouds as Turbulent Density Fluctuations: Implications for Pressure Confinement and Spectral Line Data Interpretation. *Javier Ballesteros-Paredes, Enrique Vázquez-Semadeni, & John Scalo.* 515, 286 (1999)

Detection of Magnetic Fields toward M17 through the H I Zeeman Effect. *C. L. Brogan, T. H. Troland, D. A. Roberts, & P. M. Crutcher.* 515, 304 (1999)

The Distance to the Vela Supernova Remnant. *Alexandra N. Cha, Kenneth R. Sembach, & Anthony C. Danks.* 515, L25 (1999)

The Collisions of High-Velocity Clouds with a Magnetized Gaseous Galactic Disk. *Alfredo Santillán, José Franco, Marco Martos, & Jongsoo Kim.* 515, 657 (1999)

Photodissociation Region Models of Photoevaporating Circumstellar Disks and Application to the Proplyds in Orion. *H. Störzer & D. Hollenbach.* 515, 669 (1999)

ISM: COSMIC RAYS

Radio to Gamma-Ray Emission from Shell-Type Supernova Remnants: Predictions from Nonlinear Shock Acceleration Models. *Matthew G. Baring, Donald C. Ellison, Stephen P. Reynolds, Isabelle A. Grenier, & Philippe Goret.* 513, 311 (1999)

A Markov Stochastic Process Theory of Cosmic-Ray Modulation. *Ming Zhang.* 513, 409 (1999)

Transport and Acceleration of Energetic Charged Particles near an Oblique Shock. *D. Ruffolo.* 515, 787 (1999)

ISM: DUST, EXTINCTION

On the Model of Dust in the Small Magellanic Cloud. *Victor G. Zubko.* 513, L29 (1999)

Direct Spectroscopic Evidence for Ionized Polycyclic Aromatic Hydrocarbons in the Interstellar Medium. *G. C. Sloan, T. L. Hayward, L. J. Allamandola, J. D. Bregman, B. DeVito, & D. M. Hudgins.* 513, L65 (1999)

Comparison between Multisphere Light-scattering Calculations: Rigorous Solution and Discrete-Dipole Approximation. *Yu-lin Xu & Bo Å. S. Gustafson.* 513, 894 (1999)

A High-Resolution VLA and Optical Study of NGC 604. *E. Churchwell & W. M. Goss.* 514, 188 (1999)

Reaction of H Atoms with Solid C_2H_4 and C_2H_6 at 13 K. *Kenzo Hiraoka, Kazuyosi Yamamoto, Yoshihide Kihara, Toshikazu Takayama, & Tetsuya Sato.* 514, 524 (1999)

Extended Dust Emission and Atomic Hydrogen: A Reservoir of Diffuse H_2 in NGC 1068. *Padeli P. Papadopoulos & E. R. Seaquist.* 514, L95 (1999)

Galactic Extinction from Colors and Counts of Field Galaxies in WFPC2 Frames: An Application to GRB 970228. *Rosa A. González, Andrew S. Fruchter, & Boris Dirsch.* 515, 69 (1999)

A Reanalysis of the Ultraviolet Extinction from Interstellar Dust in the Large Magellanic Cloud. *K. A. Misselt, Geoffrey C. Clayton, & Karl D. Gordon.* 515, 128 (1999)
The Circumstellar Extinction of Planetary Nebulae. *Robin Ciardullo & George H. Jacoby.* 515, 191 (1999)
Correlation between Gas and Dust in Molecular Clouds. *João Alves, Charles J. Lada, & Elizabeth A. Lada.* 515, 265 (1999)
Far-Infrared and Submillimeter Observations and Physical Models of the Reflection Nebula Cederblad 201. *Ciska Kemper, Marco Spaans, David J. Jansen, Michiel R. Hogerheijde, Ewine F. van Dishoeck, & Alexander G. G. M. Tielens.* 515, 649 (1999)
The z = 1.6748 C I Absorber toward PKS 1756+237. *Katherine C. Roth & James M. Bauer.* 515, L57 (1999)

ISM: GENERAL

Dynamical Friction in a Gaseous Medium. *Eve C. Ostriker.* 513, 252 (1999)
Kinetic and Structural Evolution of Self-gravitating, Magnetized Clouds: 2.5-dimensional Simulations of Decaying Turbulence. *Eve C. Ostriker, Charles F. Gammie, & James M. Stone.* 513, 259 (1999)
A Semianalytical Model for the Observational Properties of the Dominant Carbon Species at Different Metallicities. *Alberto D. Bolatto, James M. Jackson, & James G. Ingalls.* 513, 275 (1999)
Long-Term Scintillation Studies of Pulsars. II. Refractive Effects and the Spectrum of Plasma Density Fluctuations. *N. D. Ramesh Bhat, Yashwant Gupta, & A. Pramesh Rao.* 514, 249 (1999)
Long-Term Scintillation Studies of Pulsars. III. Testing Theoretical Models of Refractive Scintillation. *N. D. Ramesh Bhat, A. Pramesh Rao, & Yashwant Gupta.* 514, 272 (1999)
Improving Predictions for Helium Emission Lines. *Robert A. Benjamin, Evan D. Skillman, & Derck P. Smits.* 514, 307 (1999)
Mass Condensation on Proto–Globular Clusters of the Two-Component Protogalaxy. *Hideyuki Kamaya.* 514, L21 (1999)
Galactic Extinction from Colors and Counts of Field Galaxies in WFPC2 Frames: An Application to GRB 970228. *Rosa A. González, Andrew S. Fruchter, & Boris Dirsch.* 515, 69 (1999)
Clouds as Turbulent Density Fluctuations: Implications for Pressure Confinement and Spectral Line Data Interpretation. *Javier Ballesteros-Paredes, Enrique Vázquez-Semadeni, & John Scalo.* 515, 286 (1999)

ISM: H II REGIONS

JCMT Observations of Cometary Clouds in the Galactic Chimney near W4. *A. R. Taylor, Judith A. Irwin, Henry E. Matthews, & Mark H. Heyer.* 513, 339 (1999)
A High-Resolution VLA and Optical Study of NGC 604. *E. Churchwell & W. M. Goss.* 514, 188 (1999)
Massive Stars in the Quintuplet Cluster. *Donald F. Figer, Ian S. McLean, & Mark Morris.* 514, 202 (1999)
Radio Polarimetric Imaging of the Interstellar Medium: Magnetic Field and Diffuse Ionized Gas Structure near the W3/W4/W5/HB 3 Complex. *A. D. Gray, T. L. Landecker, P. E. Dewdney, A. R. Taylor, A. G. Willis, & M. Normandeau.* 514, 221 (1999)
Ultracompact H II Regions with Extended Radio-Continuum Emission. *Stanley E. Kurtz, Alan M. Watson, Peter Hofner, & Birgit Otte.* 514, 232 (1999)
On Measuring Nebular Chemical Abundances in Distant Galaxies Using Global Emission-Line Spectra. *Henry A. Kobulnicky, Robert C. Kennicutt, Jr., & James L. Pizagno.* 514, 544 (1999)
Ammonia Absorption toward the Ultracompact H II Regions G45.12+0.13 and G45.47+0.05. *Peter Hofner, Sarah Peterson, & Riccardo Cesaroni.* 514, 899 (1999)
On the Structure and Morphology of the "Diffuse Ionized Medium" in Star-forming Galaxies. *Jing Wang, Timothy M. Heckman, & Matthew D. Lehnert.* 515, 97 (1999)
Detection of Magnetic Fields toward M17 through the H I Zeeman Effect. *C. L. Brogan, T. H. Troland, D. A. Roberts, & R. M. Crutcher.* 515, 304 (1999)

ISM: INDIVIDUAL

Name: R Aquarii

The R Aquarii Jet in Hindsight. *J. M. Hollis, R. Bertram, R. M. Wagner, & C. O. Lampland.* 514, 895 (1999)

Name: Cepheus A

Disk and Ouflow in Cepheus A–HW2: Interferometric SiO and HCO^+ Observations. *José F. Gómez, Anneila I. Sargent, José M. Torrelles, Paul T. P. Ho, Luis F. Rodríguez, Jorge Cantó, & Guido Garay.* 514, 287 (1999)

Name: ρ Ophiuchi

Submillimeter Continuum Emission in the ρ Ophiuchi Molecular Cloud: Filaments, Arcs, and an Unidentified Far-Infrared Object. *Christine D. Wilson, Lorne W. Avery, Michel Fich, Doug Johnstone, Gilles Joncas, Lewis B. G. Knee, Henry E. Matthews, George F. Mitchell, Gerald H. Moriarty-Schieven, & Ralph E. Pudritz.* 513, L139 (1999)

Name: Orion Bar

Infrared Space Observatory–Long Wavelength Spectrometer Detection of the 112 Micron HD $J = 1 \rightarrow 0$ Line toward the Orion Bar. *Christopher M. Wright, Ewine F. van Dishoeck, Pierre Cox, Sunil D. Sidher, & Martin F. Kessler.* 515, L29 (1999)

Name: Orion Nebula

Photodissociation Region Models of Photoevaporating Circumstellar Disks and Application to the Proplyds in Orion. *H. Störzer & D. Hollenbach.* 515, 669 (1999)

Name: Serpens Dark Cloud

Envelope Structure of Deeply Embedded Young Stellar Objects in the Serpens Molecular Cloud. *Michiel R. Hogerheijde, Ewine F. van Dishoeck, Jante M. Salverda, & Geoffrey A. Blake.* 513, 350 (1999)

Name: Vela Supernova Remnant

The Distance to the Vela Supernova Remnant. *Alexandra N. Cha, Kenneth R. Sembach, & Anthony C. Danks.* 515, L25 (1999)

NGC Number: NGC 604

A High-Resolution VLA and Optical Study of NGC 604. *E. Churchwell & W. M. Goss.* 514, 188 (1999)

NGC Number: NGC 2024

The Magnetic Field of the NGC 2024 Molecular Cloud. *R. M. Crutcher, D. A. Roberts, T. H. Troland, & W. M. Goss.* 515, 275 (1999)

NGC Number: NGC 6818

Spectroscopic Observations of the Planetary Nebula NGC 6818. *Siek Hyung, Lawrence H. Aller, & Walter A. Feibelman.* 514, 878 (1999)

Alphanumeric: Ced 201

Far-Infrared and Submillimeter Observations and Physical Models of the Reflection Nebula Cederblad 201. *Ciska Kemper, Marco Spaans, David J. Jansen, Michiel R. Hogerheijde, Ewine F. van Dishoeck, & Alexander G. G. M. Tielens.* 515, 649 (1999)

Alphanumeric: G45.12+0.13

Ammonia Absorption toward the Ultracompact H II Regions G45.12+0.13 and G45.47+0.05. *Peter Hofner, Sarah Peterson, & Riccardo Cesaroni.* 514, 899 (1999)

Alphanumeric: G45.47+0.05

Ammonia Absorption toward the Ultracompact H II Regions G45.12+0.13 and G45.47+0.05. *Peter Hofner, Sarah Peterson, & Riccardo Cesaroni.* 514, 899 (1999)

Alphanumeric: IC 443

Radio to Gamma-Ray Emission from Shell-Type Supernova Remnants: Predictions from Nonlinear Shock Acceleration Models. *Matthew G. Baring, Donald C. Ellison, Stephen P. Reynolds, Isabelle A. Grenier, & Philippe Goret.* 513, 311 (1999)

Alphanumeric: IRAM 04191+1522

Discovery of an Extremely Young Accreting Protostar in Taurus. *P. André, F. Motte, & A. Bacmann.* 513, L57 (1999)

Alphanumeric: L977

Correlation between Gas and Dust in Molecular Clouds. *João Alves, Charles J. Lada, & Elizabeth A. Lada.* 515, 265 (1999)

Alphanumeric: L981

Correlation between Gas and Dust in Molecular Clouds. *João Alves, Charles J. Lada, & Elizabeth A. Lada.* 515, 265 (1999)

Alphanumeric: L1544

A High-Resolution Study of the Slowly Contracting, Starless Core L1544. *Jonathan P. Williams, Philip C. Myers, David J. Wilner, & James Di Francesco.* 513, L61 (1999)

Alphanumeric: M17

Detection of Magnetic Fields toward M17 through the H I Zeeman Effect. *C. L. Brogan, T. H. Troland, D. A. Roberts, & R. M. Crutcher.* 515, 304 (1999)

Alphanumeric: W3

The Synchrotron Jet from the H_2O Maser Source in W3(OH). *D. J. Wilner, M. J. Reid, & Karl M. Menten.* 513, 775 (1999)

Alphanumeric: W3(OH)

Hot Gas and Dust in a Protostellar Cluster near W3(OH). *Friedrich Wyrowski, Peter Schilke, C. Malcolm Walmsley, & Karl M. Menten.* 514, L43 (1999)

Alphanumeric: W4

JCMT Observations of Cometary Clouds in the Galactic Chimney near W4. *A. R. Taylor, Judith A. Irwin, Henry E. Matthews, & Mark H. Heyer.* 513, 339 (1999)

ISM: JETS AND OUTFLOWS

Discovery of an Extremely Young Accreting Protostar in Taurus. *P. André, F. Motte, & A. Bacmann.* 513, L57 (1999)

The Synchrotron Jet from the H_2O Maser Source in W3(OH). *D. J. Wilner, M. J. Reid, & Karl M. Menten.* 513, 775 (1999)

Submillimeter Continuum Emission in the ρ Ophiuchi Molecular Cloud: Filaments, Arcs, and an Unidentified Far-Infrared Object. *Christine D. Wilson, Lorne W. Avery, Michel Fich, Doug Johnstone, Gilles Joncas, Lewis B. G. Knee, Henry E. Matthews, George F. Mitchell, Gerald H. Moriarty-Schieven, & Ralph E. Pudritz.* 513, L139 (1999)

Disk and Ouflow in Cepheus A–HW2: Interferometric SiO and HCO^+ Observations. *José F. Gómez, Anneila I. Sargent, José M. Torrelles, Paul T. P. Ho, Luis F. Rodríguez, Jorge Cantó, & Guido Garay.* 514, 287 (1999)

The R Aquarii Jet in Hindsight. *J. M. Hollis, R. Bertram, R. M. Wagner, & C. O. Lampland.* 514, 895 (1999)

Hubble Space Telescope WFPC2 Imaging of XZ Tauri: Time Evolution of a Herbig-Haro Bow Shock. *John E. Krist, Karl R. Stapelfeldt, Christopher J. Burrows, J. Jeff Hester, Alan M. Watson, Gilda E. Ballester, John T. Clarke, David Crisp, Robin W. Evans, John S. Gallegher III, Richard E. Griffiths, John G. Hoessel, Jon A. Holtzman, Jeremy R. Mould, Paul A. Scowen, & John T. Trauger.* 515, L35 (1999)

ISM: KINEMATICS AND DYNAMICS

Smoothed Particle Hydrodynamic Simulations of Galactic Gaseous Disk with Bar: Distribution and Kinematic Structure of Molecular Clouds toward the Galactic Center. *C. W. Lee, H. M. Lee, H. B. Ann, & K. H. Kwon.* 513, 242 (1999)

Kinetic and Structural Evolution of Self-gravitating, Magnetized Clouds: 2.5-dimensional Simulations of Decaying Turbulence. *Eve C. Ostriker, Charles F. Gammie, & James M. Stone.* 513, 259 (1999)

A High-Resolution Study of the Slowly Contracting, Starless Core L1544. *Jonathan P. Williams, Philip C. Myers, David J. Wilner, & James Di Francesco.* 513, L61 (1999)

Supernova Remnants in the Magellanic Clouds. II. Supernova Remnant Breakouts from N11L and N86. *Rosa Murphy Williams, You-Hua Chu, John R. Dickel, R. Chris Smith, Douglas K. Milne, & P. Frank Winkler.* 514, 798 (1999)

Spectroscopic Observations of the Planetary Nebula NGC 6818. *Siek Hyung, Lawrence H. Aller, & Walter A. Feibelman.* 514, 878 (1999)

A Supernova-regulated Interstellar Medium: Simulations of the Turbulent Multiphase Medium. *M. J. Korpi, A. Brandenburg, A. Shukurov, I. Tuominen, & Å Nordlund.* 514, L99 (1999)

The Magnetic Field of the NGC 2024 Molecular Cloud. *R. M. Crutcher, D. A. Roberts, T. H. Troland, & W. M. Goss.* 515, 275 (1999)

Clouds as Turbulent Density Fluctuations: Implications for Pressure Confinement and Spectral Line Data Interpretation. *Javier Ballesteros-Paredes, Enrique Vázquez-Semadeni, & John Scalo.* 515, 286 (1999)

A Survey of Planetary Nebulae in the Southern Galactic Bulge. *Sylvie F. Beaulieu, Michael A. Dopita, & Kenneth C. Freeman.* 515, 610 (1999)

ISM: MAGNETIC FIELDS

Kinetic and Structural Evolution of Self-gravitating, Magnetized Clouds: 2.5-dimensional Simulations of Decaying Turbulence. *Eve C. Ostriker, Charles F. Gammie, & James M. Stone.* 513, 259 (1999)

Detection of the CN Zeeman Effect in Molecular Clouds. *Richard M. Crutcher, Thomas H. Troland, Bernard Lazareff, Gebriel Paubert, & Ilya Kazès.* 514, L121 (1999)

The Magnetic Field of the NGC 2024 Molecular Cloud. *R. M. Crutcher, D. A. Roberts, T. H. Troland, & W. M. Goss.* 515, 275 (1999)

Detection of Magnetic Fields toward M17 through the H I Zeeman Effect. *C. L. Brogan, T. H. Troland, D. A. Roberts, & R. M. Crutcher.* 515, 304 (1999)

The Collisions of High-Velocity Clouds with a Magnetized Gaseous Galactic Disk. *Alfredo Santillán, José Franco, Marco Martos, & Jongsoo Kim.* 515, 657 (1999)

The Interaction of a Strong Magnetic Field with a Cold Plasma: The Evolution of a Magnetic Bubble. *William I. Newman & Alice L. Newman.* 515, 685 (1999)

ISM: MOLECULES

The Interstellar 4.62 Micron Band. *Y. J. Pendleton, A. G. G. M. Tielens, A. T. Tokunaga, & M. P. Bernstein.* 513, 294 (1999)

Laboratory Detection of the Ring-Chain Carbenes HC_4N and HC_6N. *M. C. McCarthy, J.-U. Grabow, M. J. Travers, W. Chen, C. A. Gottlieb, & P. Thaddeus.* 513, 305 (1999)

JCMT Observations of Cometary Clouds in the Galactic Chimney near W4. *A. R. Taylor, Judith A. Irwin, Henry E. Matthews, & Mark H. Heyer.* 513, 339 (1999)

Envelope Structure of Deeply Embedded Young Stellar Objects in the Serpens Molecular Cloud. *Michiel R. Hogerheijde, Ewine F. van Dishoeck, Jante M. Salverda, & Geoffrey A. Blake.* 513, 350 (1999)

Direct Spectroscopic Evidence for Ionized Polycyclic Aromatic Hydrocarbons in the Interstellar Medium. *G. C. Sloan, T. L. Hayward, L. J. Allamandola, J. D. Bregman, B. DeVito, & D. M. Hudgins.* 513, L65 (1999)

The Spacing of the Interstellar 6.2 and 7.7 Micron Emission Features as an Indicator of Polycyclic Aromatic Hydrocarbon Size. *Douglas M. Hudgins & L. J. Allamandola.* 513, L69 (1999)

Infalling Gas toward the Galactic Center. *Alison L. Coil & Paul T. P. Ho.* 513, 752 (1999)

Disk and Ouflow in Cepheus A–HW2: Interferometric SiO and HCO^+ Observations. *José F. Gómez, Anneila I. Sargent, José M. Torrelles, Paul T. P. Ho, Luis F. Rodríguez, Jorge Cantó, & Guido Garay.* 514, 287 (1999)

Hot Gas and Dust in a Protostellar Cluster near W3(OH). *Friedrich Wyrowski, Peter Schilke, C. Malcolm Walmsley, & Karl M. Menten.* 514, L43 (1999)

Ammonia Absorption toward the Ultracompact H II Regions G45.12+0.13 and G45.47+0.05. *Peter Hofner, Sarah Peterson, & Riccardo Cesaroni.* 514, 899 (1999)

Extended Dust Emission and Atomic Hydrogen: A Reservoir of Diffuse H_2 in NGC 1068. *Padeli P. Papadopoulos & E. R. Seaquist.* 514, L95 (1999)

The Molecular ISM in Low Surface Brightness Disk Galaxies. *J. Christopher Mihos, Marco Spaans, & Stacy S. McGaugh.* 515, 89 (1999)

A High-Velocity Molecular Cloud near the Center of the Galaxy. *Tomoharu Oka, Glenn J. White, Tetsuo Hasegawa, Fumio Sato, Masato Tsuboi, & Atsushi Miyazaki.* 515, 249 (1999)

Correlation between Gas and Dust in Molecular Clouds. *João Alves, Charles J. Lada, & Elizabeth A. Lada.* 515, 265 (1999)

The Magnetic Field of the NGC 2024 Molecular Cloud. *R. M. Crutcher, D. A. Roberts, T. H. Troland, & W. M. Goss.* 515, 275 (1999)

Infrared Space Observatory–Long Wavelength Spectrometer Detection of the 112 Micron HD $J = 1 \rightarrow 0$ Line toward the Orion Bar. *Christopher M. Wright, Ewine F. van Dishoeck, Pierre Cox, Sunil D. Sidher, & Martin F. Kessler.* 515, L29 (1999)

Theoretical Modeling of *ISO* Results on Planetary Nebula NGC 7027. *Min Yan, S. R. Federman, A. Dalgarno, & J. E. Bjorkman.* 515, 640 (1999)

ISM: PLANETARY NEBULAE: GENERAL

Infrared Space Observatory Observations of IRAS 16594−4656: A New Proto–Planetary Nebula with a Strong 21 Micron Dust Feature. *Pedro García-Lario, Arturo Manchado, Ana Ulla, & Minia Manteiga.* 513, 941 (1999)

The "Water-Fountain Nebula" IRAS 16342−3814: *Hubble Space Telescope*/Very Large Array Study of a Bipolar Protoplanetary Nebula. *Raghvendra Sahai, Peter te Lintel Hekkert, Mark Morris, Albert Zijlstra, & Lauren Likkel.* 514, L115 (1999)

Chemical Abundances of Planetary Nebulae in the Bulge and Disk of M31. *George H. Jacoby & Robin Ciardullo.* 515, 169 (1999)

The Circumstellar Extinction of Planetary Nebulae. *Robin Ciardullo & George H. Jacoby.* 515, 191 (1999)

A Survey of Planetary Nebulae in the Southern Galactic Bulge. *Sylvie F. Beaulieu, Michael A. Dopita, & Kenneth C. Freeman.* 515, 610 (1999)

Toward the Evidence of the Accretion Disk Emission in the Symbiotic Star RR Telescopii. *Hee-Won Lee & Myeong-Gu Park.* 515, L89 (1999)

ISM: PLANETARY NEBULAE: INDIVIDUAL

NGC Number: NGC 40

A Detailed Analysis of the Stellar and Nebular *IUE* Spectrum of the Peculiar "O VI Sequence" Planetary Nebula NGC 40. *Walter A. Feibelman.* 514, 296 (1999)

NGC Number: NGC 2440

Radio Continuum and Recombination Line Observations of the Polypolar Planetary Nebula NGC 2440. *Roberto Vázquez, José M. Torrelles, Luis F. Rodríguez, Yolanda Gómez, J. Alberto López, & Luis F. Miranda.* 515, 633 (1999)

NGC Number: NGC 7027

Theoretical Modeling of *ISO* Results on Planetary Nebula NGC 7027. *Min Yan, S. R. Federman, A. Dalgarno, & J. E. Bjorkman.* 515, 640 (1999)

Alphanumeric: CPD −56° 8032

Water Ice, Silicate, and Polycyclic Aromatic Hydrocarbon Emission Features in the *Infrared Space Observatory* Spectrum of the Carbon-rich Planetary Nebula CPD −56° 8032. *Martin Cohen, M. J. Barlow, R. J. Sylvester, X.-W. Liu, P. Cox, T. Lim, B. Schmitt, & A. K. Speck.* 513, L135 (1999)

ISM: REFLECTION NEBULAE

Far-Infrared and Submillimeter Observations and Physical Models of the Reflection Nebula Cederblad 201. *Ciska Kemper, Marco Spaans, David J. Jansen, Michiel R. Hogerheijde, Ewine F. van Dishoeck, & Alexander G. G. M. Tielens.* 515, 649 (1999)

ISM: STRUCTURE

Smoothed Particle Hydrodynamic Simulations of Galactic Gaseous Disk with Bar: Distribution and Kinematic Structure of Molecular Clouds toward the Galactic Center. *C. W. Lee, H. M. Lee, H. B. Ann, & K. H. Kwon.* 513, 242 (1999)

Subarcsecond Optical Imaging of Proto–Planetary Nebulae. *Bruce J. Hrivnak, Philip P. Langill, Kate Y. L. Su, & Sun Kwok.* 513, 421 (1999)

Submillimeter Continuum Emission in the ρ Ophiuchi Molecular Cloud: Filaments, Arcs, and an Unidentified Far-Infrared Object. *Christine D. Wilson, Lorne W. Avery, Michel Fich, Doug Johnstone, Gilles Joncas, Lewis B. G. Knee, Henry E. Matthews, George F. Mitchell, Gerald H. Moriarty-Schieven, & Ralph E. Pudritz.* 513, L139 (1999)

A High-Resolution VLA and Optical Study of NGC 604. *E. Churchwell & W. M. Goss.* 514, 188 (1999)

Radio Polarimetric Imaging of the Interstellar Medium: Magnetic Field and Diffuse Ionized Gas Structure near the W3/W4/W5/HB 3 Complex. *A. D. Gray, T. L. Landecker, P. E. Dewdney, A. R. Taylor, A. G. Willis, & M. Normandeau.* 514, 221 (1999)

Long-Term Scintillation Studies of Pulsars. II. Refractive Effects and the Spectrum of Plasma Density Fluctuations. *N. D. Ramesh Bhat, Yashwant Gupta, & A. Pramesh Rao.* 514, 249 (1999)

Mass Condensation on Proto–Globular Clusters of the Two-Component Protogalaxy. *Hideyuki Kamaya.* 514, L21 (1999)

The R Aquarii Jet in Hindsight. *J. M. Hollis, R. Bertram, R. M. Wagner, & C. O. Lampland.* 514, 895 (1999)

The Molecular ISM in Low Surface Brightness Disk Galaxies. *J. Christopher Mihos, Marco Spaans, & Stacy S. McGaugh.* 515, 89 (1999)

On the Structure and Morphology of the "Diffuse Ionized Medium" in Star-forming Galaxies. *Jing Wang, Timothy M. Heckman, & Matthew D. Lehnert.* 515, 97 (1999)

Correlation between Gas and Dust in Molecular Clouds. *João Alves, Charles J. Lada, & Elizabeth A. Lada.* 515, 265 (1999)

The Stellar Initial Mass Function from Random Sampling in Hierarchical Clouds. II. Statistical Fluctuations and a Mass Dependence for Starbirth Positions and Times. *Bruce G. Elmegreen.* 515, 323 (1999)

ISM: SUPERNOVA REMNANTS

Hubble Space Telescope Images and Spectra of the Remnant of SN 1885 in M31. *Robert A. Fesen, Christopher L. Gerardy, Kevin M. McLin, & Andrew J. S. Hamilton.* 514, 195 (1999)

Supernova Remnants in the Magellanic Clouds. II. Supernova Remnant Breakouts from N11L and N86. *Rosa Murphy Williams, You-Hua Chu, John R. Dickel, R. Chris Smith, Douglas K. Milne, & P. Frank Winkler.* 514, 798 (1999)

The Progenitor of the New COMPTEL/*ROSAT* Supernova Remnant in Vela. *Wan Chen & Neil Gehrels.* 514, L103 (1999)

X-Ray Variability from the Compact Source in the Supernova Remnant RCW 103. *E. V. Gotthelf, R. Petre, & G. Vasisht.* 514, L107 (1999)

The Distance to the Vela Supernova Remnant. *Alexandra N. Cha, Kenneth R. Sembach, & Anthony C. Danks.* 515, L25 (1999)

The "Rabbit": A Potential Radio Counterpart of GeV J1417−6100. *Mallory S. E. Roberts, Roger W. Romani, Simon Johnston, & Anne J. Green.* 515, 712 (1999)

LINE: FORMATION

Line-driven Ablation and Wind Tilting by External Irradiation. *K. G. Gayley, S. P. Owocki, & S. R. Cranmer.* 513, 442 (1999)

Photodissociation Region Models of Photoevaporating Circumstellar Disks and Application to the Proplyds in Orion. *H. Störzer & D. Hollenbach.* 515, 669 (1999)

LINE FORMATION

The X-Ray Afterglow of the Gamma-Ray Burst of 1997 May 8: Spectral Variability and Possible Evidence of an Iron Line. *L. Piro, E. Costa, M. Feroci, F. Frontera, L. Amati, D. Dal Fiume, L. A. Antonelli, J. Heise, J. in 't Zand, A. Owens, A. N. Parmar, G. Cusumano, M. Vietri, & G. C. Perola.* 514, L73 (1999)

LINE: IDENTIFICATION

The Interstellar 4.62 Micron Band. *Y. J. Pendleton, A. G. G. M. Tielens, A. T. Tokunaga, & M. P. Bernstein.* 513, 294 (1999)

Laboratory Detection of the Ring-Chain Carbenes HC_4N and HC_6N. *M. C. McCarthy, J.-U. Grabow, M. J. Travers, W. Chen, C. A. Gottlieb, & P. Thaddeus.* 513, 305 (1999)

A Detailed Analysis of the Stellar and Nebular *IUE* Spectrum of the Peculiar "O VI Sequence" Planetary Nebula NGC 40. *Walter A. Feibelman.* 514, 296 (1999)

LINE: PROFILES

Experimental Stark Widths and Shifts of Several Ne I Spectral Lines. *J. A. del Val, J. A. Aparicio, & S. Mar.* 513, 535 (1999)

A Statistical Study of Rest-Frame Optical Emission Properties in Luminous Quasars at $2.0 \leq z \leq 2.5$. *D. H. McIntosh, M. J. Rieke, H.-W. Rix, C. B. Foltz, & R. J. Weymann.* 514, 40 (1999)

Wind Inhomogeneities in Wolf-Rayet Stars. II. Investigation of Emission-Line Profile Variations. *Sébastien Lépine & Anthony F. J. Moffat.* 514, 909 (1999)

LINE PROFILES

The Distance to the Vela Supernova Remnant. *Alexandra N. Cha, Kenneth R. Sembach, & Anthony C. Danks.* 515, L25 (1999)

MAGNETIC FIELDS

Hard X-Ray Radiation in the Coma Cluster Spectrum. *Roberto Fusco-Femiano, Daniele Dal Fiume, Luigina Feretti, Gabriele Giovannini, Paola Grandi, Giorgio Matt, Silvano Molendi, & Andrea Santangelo.* 513, L21 (1999)

Images and Spectra from the Interior of a Relativistic Fireball. *Jonathan Granot, Tsvi Piran, & Re'em Sari.* 513, 679 (1999)

Magnetic Propeller Outflows. *R. V. E. Lovelace, M. M. Romanova, & G. S. Bisnovatyi-Kogan.* 514, 368 (1999)

Cosmological Magnetic Field Limits in an Inhomogeneous Universe. *Pasquale Blasi, Scott Burles, & Angela V. Olinto.* 514, L79 (1999)

Rossi X-Ray Timing Explorer Hard X-Ray Observation of Abell 754: Constraining the Hottest Temperature Component and the Intracluster Magnetic Field. *Azita Valinia, Mark J. Henriksen, Michael Lowenstein, Kurt Roettiger, Richard F. Mushotzky, & Greg Madejski.* 515, 42 (1999)

MAGNETOHYDRODYNAMICS: MHD

Kinetic and Structural Evolution of Self-gravitating, Magnetized Clouds: 2.5-dimensional Simulations of Decaying Turbulence. *Eve C. Ostriker, Charles F. Gammie, & James M. Stone.* 513, 259 (1999)

Dynamics of Plasma Close to the Horizon of a Schwarzschild Black Hole. *Wenchien Chou & Toshiki Tajima.* 513, 401 (1999)

Simulation of Magnetic Reconnection with Heat Conduction. *P. F. Chen, C. Fang, Y. H. Tang, & M. D. Ding.* 513, 516 (1999)

Extreme-Ultraviolet Jets and Hα Surges in Solar Microflares. *Jongchul Chae, Jiong Qiu, Haimin Wang, & Philip R. Goode.* 513, L75 (1999)

Nonlinear α-Effect in Dynamo Theory. *George B. Field, Eric G. Blackman, & Hongsong Chou.* 513, 638 (1999)

Microscopic Nonthermal Plasma Notions of Coronal Loops in a Solar Active Region. *H. Hara & K. Ichimoto.* 513, 969 (1999)

Slow Magnetosonic Waves in Coronal Plumes. *L. Ofman, V. M. Nakariakov, & C. E. DeForest.* 514, 441 (1999)

Evolution of Eruptive Flares. II. The Occurrence of Locally Enhanced Resistivity. *Tetsuya Magara & Kazunari Shibata.* 514, 456 (1999)

Alfvén Wave Model of Spicules and Coronal Heating. *Takahiro Kudoh & Kazunari Shibata.* 514, 493 (1999)

A Multidimensional Code for Isothermal Magnetohydrodynamic Flows in Astrophysics. *Jongsoo Kim, Dongsu Ryu, T. W. Jones, & Seung Soo Hong.* 514, 506 (1999)

A Supernova-regulated Interstellar Medium: Simulations of the Turbulent Multiphase Medium. *M. J. Korpi, A. Brandenburg, A. Shukurov, I. Tuominen, & Å Nordlund.* 514, L99 (1999)

The Collisions of High-Velocity Clouds with a Magnetized Gaseous Galactic Disk. *Alfredo Santillán, José Franco, Marco Martos, & Jongsoo Kim.* 515, 657 (1999)

The Interaction of a Strong Magnetic Field with a Cold Plasma: The Evolution of a Magnetic Bubble. *William I. Newman & Alice L. Newman.* 515, 685 (1999)

Magnetorotational Instability in Protoplanetary Disks. I. On the Global Stability of Weakly Ionized Disks with Ohmic Dissipation. *Takayoshi Sano & Shoken M. Miyama.* 515, 776 (1999)

Stochastic Acceleration of Electrons by Plasma Waves. III. Waves Propagating Perpendicular to the Magnetic Field. *Julia M. Pryadko & Vahé Petrosian.* 515, 873 (1999)

Magnetized Accretion inside the Marginally Stable Orbit around a Black Hole. *J. H. Krolik.* 515, L73 (1999)

Confined Disruption of a Three-dimensional Twisted Magnetic Flux Tube. *T. Amari & J. F. Luciani.* 515, L81 (1999)

MASERS

Megamaser Disks in Active Galactic Nuclei. *John F. Kartje, Arieh Königl, & Moshe Elitzur.* 513, 180 (1999)

The Synchrotron Jet from the H_2O Maser Source in W3(OH). *D. J. Wilner, M. J. Reid, & Karl M. Menten.* 513, 775 (1999)

METEORS, METEOROIDS

Sodium Tails of Comets: Na/O and Na/Si Abundances in Interplanetary Dust Particles. *Frans J. M. Rietmeijer.* 514, L125 (1999)

METHODS: DATA ANALYSIS

Cumulant Correlators from the APM. *István Szapudi & Alexander S. Szalay.* 515, L43 (1999) (Orig. paper in 481, L1 (1997))

METHODS: LABORATORY

Experimental Stark Widths and Shifts of Several Ne I Spectral Lines. *J. A. del Val, J. A. Aparicio, & S. Mar.* 513, 535 (1999)

The SiC Problem: Astronomical and Meteoritic Evidence. *A. K. Speck, A. M. Hofmeister, & M. J. Barlow.* 513, L87 (1999)

Reaction of H Atoms with Solid C_2H_4 and C_2H_6 at 13 K. *Kenzo Hiraoka, Kazuyosi Yamamoto, Yoshihide Kihara, Toshikazu Takayama, & Tetsuya Sato.* 514, 524 (1999)

METHODS: NUMERICAL

Smoothed Particle Hydrodynamic Simulations of Galactic Gaseous Disk with Bar: Distribution and Kinematic Structure of Molecular Clouds toward the Galactic Center. *C. W. Lee, H. M. Lee, H. B. Ann, & K. H. Kwon.* 513, 242 (1999)

On the Self-consistent Response of Stellar Systems to Gravitational Shocks. *Oleg Y. Gnedin & Jeremiah P. Ostriker.* 513, 626 (1999)

Where Are the Baryons? *Renyue Cen & Jeremiah P. Ostriker.* 514, 1 (1999)

On the Azimuthal Structure of Thermal Convection in Circumstellar Disks. *H. H. Klahr, Th. Henning, & W. Kley.* 514, 325 (1999)

A Multidimensional Code for Isothermal Magnetohydrodynamic Flows in Astrophysics. *Jongsoo Kim, Dongsu Ryu, T. W. Jones, & Seung Soo Hong.* 514, 506 (1999)

Substructure in Dark Halos: Orbital Eccentricities and Dynamical Friction. *Frank C. van den Bosch, Geraint F. Lewis, George Lake, & Joachim Stadel.* 515, 50 (1999)

Recovering the Primordial Density Fluctuations: A Comparison of Methods. *Vijay K. Narayanan & Rupert A. C. Croft.* 515, 471 (1999)

Self-regulating Galaxy Formation as an Explanation for the Tully-Fisher Relation. *D. Elizondo, G. Yepes, R. Kates, V. Müller, & A. Klypin.* 515, 525 (1999)

Accretion Disk Reversal and the Spin-up/Spin-down of Accreting Pulsars. *James R. Murray, Martijn de Kool, & Jianke Li.* 515, 738 (1999)

METHODS: STATISTICAL

A Global Descriptor of Spatial Pattern Interaction in the Galaxy Distribution. *Martin Kerscher, María Jesús Pons-Bordería, Jens Schmalzing, Roberto Trasarti-Battistoni, Thomas Buchert, Vicent J. Martínez, & Riccardo Valdarnini.* 513, 543 (1999)

On the Solar-Cycle Modulation of the Homestake Solar Neutrino Capture Rate and the Shuffle Test. *Guenther Walther.* 513, 990 (1999)

A Cutoff in the X-Ray Fluctuation Power Density Spectrum of the Seyfert 1 Galaxy NGC 3516. *Rick Edelson & Kirpal Nandra.* 514, 682 (1999)

A Statistical Treatment of the Gamma-Ray Burst "No Host Galaxy" Problem. II. Energies of Standard Candle Bursts. *David L. Band, Dieter H. Hartmann, & Bradley E. Schaefer.* 514, 862 (1999)

A Precision Test of *Hipparcos* Systematics toward the Hyades. *Vijay K. Narayanan & Andrew Gould.* 515, 256 (1999)

Cumulant Correlators from the APM. *István Szapudi & Alexander S. Szalay.* 515, L43 (1999) (Orig. paper in 481, L1 (1997))

A New Measure of the Clustering of QSO Heavy-Element Absorption-Line Systems. *Jean M. Quashnock & Michael L. Stein.* 515, 506 (1999)

MOLECULAR DATA

Laboratory Detection of the Ring-Chain Carbenes HC_4N and HC_6N. *M. C. McCarthy, J.-U. Grabow, M. J. Travers, W. Chen, C. A. Gottlieb, & P. Thaddeus.* 513, 305 (1999)

The Spacing of the Interstellar 6.2 and 7.7 Micron Emission Features as an Indicator of Polycyclic Aromatic Hydrocarbon Size. *Douglas M. Hudgins & L. J. Allamandola.* 513, L69 (1999)

Rates for the Electron Impact Dissociation of Molecular Hydrogen. *Darian T. Stibbe & Jonathan Tennyson.* 513, L147 (1999)

Quantum-mechanical Study of Ro-vibrational Transitions in H_2 Induced by He Atoms. *N. Balakrishnan, R. C. Forrey, & A. Dalgarno.* 514, 520 (1999)

MOLECULAR PROCESSES

New H and H_2 Reactions with Small Hydrocarbon Ions and Their Roles in Benzene Synthesis in Dense Interstellar Clouds. *Murray J. McEwan, Graham B. I. Scott, Nigel G. Adams, Lucia M. Babcock, R. Terzieva, & Eric Herbst.* 513, 287 (1999)

Laboratory Detection of the Ring-Chain Carbenes HC_4N and HC_6N. *M. C. McCarthy, J.-U. Grabow, M. J. Travers, W. Chen, C. A. Gottlieb, & P. Thaddeus.* 513, 305 (1999)

Rates for the Electron Impact Dissociation of Molecular Hydrogen. *Darian T. Stibbe & Jonathan Tennyson.* 513, L147 (1999)

Quantum-mechanical Study of Ro-vibrational Transitions in H_2 Induced by He Atoms. *N. Balakrishnan, R. C. Forrey, & A. Dalgarno.* 514, 520 (1999)

Reaction of H Atoms with Solid C_2H_4 and C_2H_6 at 13 K. *Kenzo Hiraoka, Kazuyosi Yamamoto, Yoshihide Kihara, Toshikazu Takayama, & Tetsuya Sato.* 514, 524 (1999)

Theoretical Modeling of *ISO* Results on Planetary Nebula NGC 7027. *Min Yan, S. R. Federman, A. Dalgarno, & J. E. Bjorkman.* 515, 640 (1999)

Far-Infrared and Submillimeter Observations and Physical Models of the Reflection Nebula Cederblad 201. *Ciska Kemper, Marco Spaans, David J. Jansen, Michiel R. Hogerheijde, Ewine F. van Dishoeck, & Alexander G. G. M. Tielens.* 515, 649 (1999)

NUCLEAR REACTIONS, NUCLEOSYNTHESIS, ABUNDANCES

Evolution of 3–9 $M_\odot$ Stars for z = 0.001–0.03 and Metallicity Effects on Type Ia Supernovae. *Hideyuki Umeda, Ken'ichi Nomoto, Hitoshi Yamaoka, & Shinya Wanajo.* 513, 861 (1999)

A Model for Calculating the Abundances of Neutron-Capture Elements in Metal-poor Stars. *Bo Zhang, Ji Li, Caixia Zhang, Yanchun Liang, & Qiuhe Peng.* 513, 910 (1999)

Neutrino Fluence after *r*-Process Freezeout and Abundances of Te Isotopes in Presolar Diamonds. *Y. Z. Qian, P. Vogel, & G. J. Wasserburg.* 513, 956 (1999)

Is U Aquarii a Thorne-Zytkow Object? *Andrew D. Vanture, Daniel Zucker, & George Wallerstein.* 514, 932 (1999)

On the Evolution of Stars that Form Electron-degenerate Cores Processed by Carbon Burning. V. Shell Convection Sustained by Helium Burning, Transient Neon Burning, Dredge-out, Urca Cooling, and Other Properties of an 11 $M_\odot$ Population I Model Star. *Claudio Ritossa, Enrique García-Berro, & Icko Iben, Jr.* 515, 381 (1999)

PLANETS AND SATELLITES: GENERAL

Tidally Induced Gap Formation in Protostellar Disks: Gap Clearing and Suppression of Protoplanetary Growth. *G. Bryden, Xingming Chen, D. N. C. Lin, Richard P. Nelson, & John C. B. Papaloizou.* 514, 344 (1999)

PLANETS AND SATELLITES: INDIVIDUAL

Neptune

Detection of the Methyl Radical on Neptune. *B. Bézard, P. N. Romani, H. Feuchtgruber, & T. Encrenaz.* 515, 868 (1999)

PLASMAS

Dynamics of Plasma Close to the Horizon of a Schwarzschild Black Hole. *Wenchien Chou & Toshiki Tajima.* 513, 401 (1999)

Experimental Stark Widths and Shifts of Several Ne I Spectral Lines. *J. A. del Val, J. A. Aparicio, & S. Mar.* 513, 535 (1999)

Microscopic Nonthermal Plasma Notions of Coronal Loops in a Solar Active Region. *H. Hara & K. Ichimoto.* 513, 969 (1999)

Magnetic Propeller Outflows. *R. V. E. Lovelace, M. M. Romanova, & G. S. Bisnovatyi-Kogan.* 514, 368 (1999)

Stochastic Acceleration of Electrons by Plasma Waves. III. Waves Propagating Perpendicular to the Magnetic Field. *Julia M. Pryadko & Vahé Petrosian.* 515, 873 (1999)

POLARIZATION

A Discrete-Ordinates Solution for a Polarization Model with Complete Frequency Redistribution. *L. B. Barichello & C. E. Siewert.* 513, 370 (1999)

Radio Polarimetric Imaging of the Interstellar Medium: Magnetic Field and Diffuse Ionized Gas Structure near the W3/W4/W5/HB 3 Complex. *A. D. Gray, T. L. Landecker, P. E. Dewdney, A. R. Taylor, A. G. Willis, & M. Normandeau.* 514, 221 (1999)

The Granular Magnetic Fields of the Quiet Sun. *Haosheng Lin & Thomas Rimmele.* 514, 448 (1999)

Ultraviolet Imaging Polarimetry of Narrow-Line Radio Galaxies. *Todd Hurt, Robert Antonucci, Ross Cohen, Anne Kinney, & Julian Krolik.* 514, 579 (1999)

The Polarized Spectrum of APM 08279+5255. *Dean C. Hines, Gary D. Schmidt, & Paul S. Smith.* 514, L91 (1999)

Weak Lensing by Large-Scale Structure and the Polarization Properties of Distant Radio Sources. *Gabriela C. Surpi & Diego D. Harari.* 515, 455 (1999)

Polarized Broad Hα Emission from the LINER Nucleus of NGC 1052. *Aaron J. Barth, Alexei V. Filippenko, & Edward C. Moran.* 515, L61 (1999)

Toward the Evidence of the Accretion Disk Emission in the Symbiotic Star RR Telescopii. *Hee-Won Lee & Myeong-Gu Park.* 515, L89 (1999)

RADIATION MECHANISMS: NONTHERMAL

The Radio-Optical Jet in NGC 3862 from Parsec to Subkiloparsec Scales. *L. Lara, L. Feretti, G. Giovannini, S. Baum, W. D. Cotton, C. P. O'Dea, & T. Venturi.* 513, 197 (1999)

Radio to Gamma-Ray Emission from Shell-Type Supernova Remnants: Predictions from Nonlinear Shock Acceleration Models. *Matthew G. Baring, Donald C. Ellison, Stephen P. Reynolds, Isabelle A. Grenier, & Philippe Goret.* 513, 311 (1999)

Short-Timescale Variability in the External Shock Model of Gamma-Ray Bursts. *Charles D. Dermer & Kurt E. Mitman.* 513, L5 (1999)

Hard X-Ray Radiation in the Coma Cluster Spectrum. *Roberto Fusco-Femiano, Daniele Dal Fiume, Luigina Feretti, Gabriele Giovannini, Paola Grandi, Giorgio Matt, Silvano Molendi, & Andrea Santangelo.* 513, L21 (1999)

The Synchrotron Jet from the H_2O Maser Source in W3(OH). *D. J. Wilner, M. J. Reid, & Karl M. Menten.* 513, 775 (1999)

High-Energy Emission from the TeV Blazar Markarian 501 during Multiwavelength Observations in 1996. *J. Kataoka, J. R. Mattox, J. Quinn, H. Kubo, F. Makino, T. Takahashi, S. Inoue, R. C. Hartman, G. M. Madejski, P. Sreekumar, & S. J. Wagner.* 514, 138 (1999)

Using Temporal Variations of the Nonthermal Redshifted Ly*alpha* Emission to Deduce Properties of Proton Beams Injected into a Stellar Atmosphere. *Jeffrey W. Brosius & Bruce E. Woodgate.* 514, 430 (1999)

On the Extreme-Ultraviolet Emission from Galaxy Clusters. *John S. Arabadjis & Joel N. Bregman.* 514, 607 (1999)

Time-integrated Gamma-Ray Burst Synchrotron Spectra from Blast-Wave/Cloud Interactions. *James Chiang.* 514, 856 (1999)

Is Coherence Essential to Account for Pulsar Radio Emission? *Bing Zhang, B. H. Hong, & G. J. Qiao.* 514, L111 (1999)

ASCA and Contemporaneous Ground-based Observations of the BL Lacertae Objects 1749+096 and 2200+420 (BL Lac). *Rita M. Sambruna, Gabriele Ghisellini, Eric Hooper, R. I. Kollgaard, Joseph E. Pesce, & C. Megan Urry.* 515, 140 (1999)

Multicomponent X-Ray Emissions from Regions near or on the Pulsar Surface. *K. S. Cheng & L. Zhang.* 515, 337 (1999)

V2301 Ophiuchi: An X-Ray–bright Eclipsing AM Herculis Object. *Thomas Y. Steiman-Cameron & James N. Imamura.* 515, 404 (1999)

The Synchrotron Peak Shift during High-Energy Flares of Blazars. *Markus Böttcher.* 515, L21 (1999)

The External Shock Model of Gamma-Ray Bursts: Three Predictions and a Paradox Resolved. *Charles D. Dermer, Markus Böttcher, & James Chiang.* 515, L49 (1999)

RADIATION MECHANISMS: THERMAL

Multicomponent X-Ray Emissions from Regions near or on the Pulsar Surface. *K. S. Cheng & L. Zhang.* 515, 337 (1999)

Thermal X-Ray Line Emission from Accreting Black Holes. *Ramesh Narayan & John Raymond.* 515, L69 (1999)

RADIATIVE TRANSFER

A Discrete-Ordinates Solution for a Polarization Model with Complete Frequency Redistribution. *L. B. Barichello & C. E. Siewert.* 513, 370 (1999)

Reflected Spectra and Albedos of Extrasolar Giant Planets. I. Clear and Cloudy Atmospheres. *Mark S. Marley, Christopher Gelino, Denise Stephens, Jonathan I. Lunine, & Richard Freedman.* 513, 879 (1999)

Comparison between Multisphere Light-scattering Calculations: Rigorous Solution and Discrete-Dipole Approximation. *Yu-lin Xu & Bo Å. S. Gustafson.* 513, 894 (1999)

Radiative Transfer in a Clumpy Universe. III. The Nature of Cosmological Ionizing Sources. *Piero Madau, Francesco Haardt, & Martin J. Rees.* 514, 648 (1999)

RADIO CONTINUUM: GALAXIES

Radio Identification of Submillimeter Sources in the Hubble Deep Field. *E. A. Richards.* 513, L9 (1999)

The Radio-to-Submillimeter Spectral Index as a Redshift Indicator. *C. L. Carilli & Min Su Yun.* 513, L13 (1999)

Determining the Fraction of Intrinsic C IV Absorption in Quasi-stellar Object Absorption-Line Systems. *Gordon T. Richards, Donald G. York, Brian Yanny, Ronald I. Kollgaard, S. A. Laurent-Muehleisen, & Daniel E. Vanden Berk.* 513, 576 (1999)

G359.87+0.18, An FR II Radio Galaxy 15′ from Sagittarius A*: Implications for the Scattering Region in the Galactic Center. *T. Joseph W. Lazio, K. R. Anantharamaiah, W. M. Goss, Namir E. Kassim, & James M. Cordes.* 515, 196 (1999)

CTD 93 and the Nature of Gigahertz-peaked Spectrum Radio Sources. *David B. Shaffer, K. I. Kellermann, & T. J. Cornwell.* 515, 558 (1999)

On Radio and X-Ray Emission Mechanisms in Nearby, X-Ray–bright Galactic Nuclei. *Insu Yi & Stephen P. Boughn.* 515, 576 (1999)

RADIO CONTINUUM: GENERAL

A Subrelativistic Shock Model for the Radio Emission of SN 1998bw. *Eli Waxman & Abraham Loeb.* 515, 721 (1999)

RADIO CONTINUUM: ISM

The Synchrotron Jet from the H_2O Maser Source in W3(OH). *D. J. Wilner, M. J. Reid, & Karl M. Menten.* 513, 775 (1999)

A High-Resolution VLA and Optical Study of NGC 604. *E. Churchwell & W. M. Goss.* 514, 188 (1999)

Radio Polarimetric Imaging of the Interstellar Medium: Magnetic Field and Diffuse Ionized Gas Structure near the W3/W4/W5/HB 3 Complex. *A. D. Gray, T. L. Landecker, P. E. Dewdney, A. R. Taylor, A. G. Willis, & M. Normandeau.* 514, 221 (1999)

Ultracompact H II Regions with Extended Radio-Continuum Emission. *Stanley E. Kurtz, Alan M. Watson, Peter Hofner, & Birgit Otte.* 514, 232 (1999)

Hot Gas and Dust in a Protostellar Cluster near W3(OH). *Friedrich Wyrowski, Peter Schilke, C. Malcolm Walmsley, & Karl M. Menten.* 514, L43 (1999)

The "Rabbit": A Potential Radio Counterpart of GeV J1417−6100. *Mallory S. E. Roberts, Roger W. Romani, Simon Johnston, & Anne J. Green.* 515, 712 (1999)

RADIO CONTINUUM: STARS

Discovery of an Extremely Young Accreting Protostar in Taurus. *P. André, F. Motte, & A. Bacmann.* 513, L57 (1999)

Radio and X-Ray Observations of the 1998 Outburst of the Recurrent X-Ray Transient 4U 1630−47. *R. M. Hjellming, M. P. Rupen, A. J. Mioduszewski, E. Kuulkers, M. McCollough, B. A. Harmon, M. Buxton, R. Sood, A. Tzioumis, D. Rayner, S. Dieters, & P. Durouchoux.* 514, 383 (1999)

Origin of the Transient, Unpulsed Radio Emission from the PSR B1259−63 Binary System. *Lewis Ball, Andrew Melatos, Simon Johnston, & Olaf Skjæraasen.* 514, L39 (1999)

Competing Drifting Radio Subpulses in PSR B0031−07. *M. Vivekanand & B. C. Joshi.* 515, 398 (1999)

RADIO LINES: GALAXIES

Detection of CO (4–3), CO (9–8), and Dust Emission in the Broad Absorption Line Quasar APM 08279+5255 at a Redshift of 3.9. *D. Downes, R. Neri, T. Wiklind, D. J. Wilner, & P. A. Shaver.* 513, L1 (1999)

The Eastern Arm of M83 Revisited: High-Resolution Mapping of ^{12}CO 1–0 Emission. *Richard J. Rand, Steven D. Lord, & James L. Higdon.* 513, 720 (1999)

Warped Galaxies from Misaligned Angular Momenta. *Victor P. Debattista & J. A. Sellwood.* 513, L107 (1999)

RADIO LINES: ISM

A Semianalytical Model for the Observational Properties of the Dominant Carbon Species at Different Metallicities. *Alberto D. Bolatto, James M. Jackson, & James G. Ingalls.* 513, 275 (1999)

Laboratory Detection of the Ring-Chain Carbenes HC_4N and HC_6N. *M. C. McCarthy, J.-U. Grabow, M. J. Travers, W. Chen, C. A. Gottlieb, & P. Thaddeus.* 513, 305 (1999)

JCMT Observations of Cometary Clouds in the Galactic Chimney near W4. *A. R. Taylor, Judith A. Irwin, Henry E. Matthews, & Mark H. Heyer.* 513, 339 (1999)

Infalling Gas toward the Galactic Center. *Alison L. Coil & Paul T. P. Ho.* 513, 752 (1999)

Detection of Magnetic Fields toward M17 through the H I Zeeman Effect. *C. L. Brogan, T. H. Troland, D. A. Roberts, & R. M. Crutcher.* 515, 304 (1999)

Radio Continuum and Recombination Line Observations of the Polypolar Planetary Nebula NGC 2440. *Roberto Vázquez, José M. Torrelles, Luis F. Rodríguez, Yolanda Gómez, J. Alberto López, & Luis F. Miranda.* 515, 633 (1999)

RELATIVITY

Relativistic and Newtonian Core-Shell Models: Analytical and Numerical Results. *Werner M. Vieira & Patricio S. Letelier.* 513, 383 (1999)

Theoretical Oscillator Strengths and Hyperfine Structure in Hg II. *Tomas Brage, Charles Proffitt, & David S. Leckrone.* 513, 524 (1999)

Hydrodynamics of a Relativistic Fireball: The Complete Evolution. *Shiho Kobayashi, Tsvi Piran, & Re'em Sari.* 513, 669 (1999)

Images and Spectra from the Interior of a Relativistic Fireball. *Jonathan Granot, Tsvi Piran, & Re'em Sari.* 513, 679 (1999)

Relativistic Precession around Rotating Neutron Stars: Effects Due to Frame Dragging and Stellar Oblateness. *Sharon M. Morsink & Luigi Stella.* 513, 827 (1999)

The Quadrupole Oscillations of Strange Quark Stars. *C. W. Yip, M.-C. Chu, & P. T. Leung.* 513, 849 (1999)

A Comment on the Viscous Stability of Relativistic Keplerian Accretion Disks. *Rafal Moderski & Bozena Czerny.* 513, L123 (1999)

X-Ray Novae, Event Horizons, and the Exponential Metric. *Stanley L. Robertson.* 515, 365 (1999)

A Numerical Study of Normal Modes of Rotating Neutron Star Models by the Cowling Approximation. *Shin'ichirou Yoshida & Yoshiharu Eriguchi.* 515, 414 (1999)

Evidence for Antipodal Hot Spots during X-Ray Bursts from 4U 1636−536. *M. Coleman Miller.* 515, L77 (1999)

SCATTERING

Comparison between Multisphere Light-scattering Calculations: Rigorous Solution and Discrete-Dipole Approximation. *Yu-lin Xu & Bo Å. S. Gustafson.* 513, 894 (1999)

Rates for the Electron Impact Dissociation of Molecular Hydrogen. *Darian T. Stibbe & Jonathan Tennyson.* 513, L147 (1999)

Long-Term Scintillation Studies of Pulsars. II. Refractive Effects and the Spectrum of Plasma Density Fluctuations. *N. D. Ramesh Bhat, Yashwant Gupta, & A. Pramesh Rao.* 514, 249 (1999)

Long-Term Scintillation Studies of Pulsars. III. Testing Theoretical Models of Refractive Scintillation. *N. D. Ramesh Bhat, A. Pramesh Rao, & Yashwant Gupta.* 514, 272 (1999)

G359.87+0.18, An FR II Radio Galaxy 15′ from Sagittarius A*: Implications for the Scattering Region in the Galactic Center. *T. Joseph W. Lazio, K. R. Anantharamaiah, W. M. Goss, Namir E. Kassim, & James M. Cordes.* 515, 196 (1999)

Toward the Evidence of the Accretion Disk Emission in the Symbiotic Star RR Telescopii. *Hee-Won Lee & Myeong-Gu Park.* 515, L89 (1999)

SHOCK WAVES

Dynamical Friction in a Gaseous Medium. *Eve C. Ostriker.* 513, 252 (1999)

Kinetic and Structural Evolution of Self-gravitating, Magnetized Clouds: 2.5-dimensional Simulations of Decaying Turbulence. *Eve C. Ostriker, Charles F. Gammie, & James M. Stone.* 513, 259 (1999)

Radio to Gamma-Ray Emission from Shell-Type Supernova Remnants: Predictions from Nonlinear Shock Acceleration Models. *Matthew G. Baring, Donald C. Ellison, Stephen P. Reynolds, Isabelle A. Grenier, & Philippe Goret.* 513, 311 (1999)

Hydrodynamics of a Relativistic Fireball: The Complete Evolution. *Shiho Kobayashi, Tsvi Piran, & Re'em Sari.* 513, 669 (1999)

Images and Spectra from the Interior of a Relativistic Fireball. *Jonathan Granot, Tsvi Piran, & Re'em Sari.* 513, 679 (1999)

Do Jet-driven Shocks Ionize the Narrow-Line Regions of Seyfert Galaxies? *A. S. Wilson & J. C. Raymond.* 513, L115 (1999)

A Multidimensional Code for Isothermal Magnetohydrodynamic Flows in Astrophysics. *Jongsoo Kim, Dongsu Ryu, T. W. Jones, & Seung Soo Hong.* 514, 506 (1999)

Time-integrated Gamma-Ray Burst Synchrotron Spectra from Blast-Wave/Cloud Interactions. *James Chiang.* 514, 856 (1999)

VLA Observations of the Interacting-Wind Binary System WR 147. *M. E. Contreras & L. F. Rodríguez.* 515, 762 (1999)

Transport and Acceleration of Energetic Charged Particles near an Oblique Shock. *D. Ruffolo.* 515, 787 (1999)

SOLAR SYSTEM: FORMATION

Neutrino Fluence after *r*-Process Freezeout and Abundances of Te Isotopes in Presolar Diamonds. *Y. Z. Qian, P. Vogel, & G. J. Wasserburg.* 513, 956 (1999)

Magnetorotational Instability in Protoplanetary Disks. I. On the Global Stability of Weakly Ionized Disks with Ohmic Dissipation. *Takayoshi Sano & Shoken M. Miyama.* 515, 776 (1999)

SOLAR SYSTEM: GENERAL

Sodium Tails of Comets: Na/O and Na/Si Abundances in Interplanetary Dust Particles. *Frans J. M. Rietmeijer.* 514, L125 (1999)

STARS: ABUNDANCES

Evolution of 3–9 $M_\odot$ Stars for z = 0.001–0.03 and Metallicity Effects on Type Ia Supernovae. *Hideyuki Umeda, Ken'ichi Nomoto, Hitoshi Yamaoka, & Shinya Wanajo.* 513, 861 (1999)

Is U Aquarii a Thorne-Zytkow Object? *Andrew D. Vanture, Daniel Zucker, & George Wallerstein.* 514, 932 (1999)

Chemical Abundances of Planetary Nebulae in the Bulge and Disk of M31. *George H. Jacoby & Robin Ciardullo.* 515, 169 (1999)

On the Evolution of Stars that Form Electron-degenerate Cores Processed by Carbon Burning. V. Shell Convection Sustained by Helium Burning, Transient Neon Burning, Dredge-out, Urca Cooling, and Other Properties of an 11 $M_\odot$ Population I Model Star. *Claudio Ritossa, Enrique García-Berro, & Icko Iben, Jr.* 515, 381 (1999)

STARS: ACTIVITY

Implications from Extreme-Ultraviolet Observations for Coronal Heating of Active Stars. *Marc Audard, Manuel Güdel, & Edward F. Guinan.* 513, L53 (1999)

Extreme Ultraviolet Explorer Photometry of RS Canum Venaticorum Systems: Four Flaring Megaseconds. *Rachel A. Osten & Alexander Brown.* 515, 746 (1999)

STARS: AGB AND POST-AGB

Subarcsecond Optical Imaging of Proto–Planetary Nebulae. *Bruce J. Hrivnak, Philip P. Langill, Kate Y. L. Su, & Sun Kwok.* 513, 421 (1999)

Infrared Space Observatory Observations of IRAS 16594−4656: A New Proto–Planetary Nebula with a Strong 21 Micron Dust Feature. *Pedro García-Lario, Arturo Manchado, Ana Ulla, & Minia Manteiga.* 513, 941 (1999)

The "Water-Fountain Nebula" IRAS 16342−3814: *Hubble Space Telescope*/Very Large Array Study of a Bipolar Protoplanetary Nebula. *Raghvendra Sahai, Peter te Lintel Hekkert, Mark Morris, Albert Zijlstra, & Lauren Likkel.* 514, L115 (1999)

Chemical Abundances of Planetary Nebulae in the Bulge and Disk of M31. *George H. Jacoby & Robin Ciardullo.* 515, 169 (1999)

The Circumstellar Extinction of Planetary Nebulae. *Robin Ciardullo & George H. Jacoby.* 515, 191 (1999)

STARS: ATMOSPHERES

Spectrophotometric Resolution of Stellar Surfaces with Microlensing. *B. Scott Gaudi & Andrew Gould.* 513, 619 (1999)

Application of Realistic Model Atmospheres to Eclipse Maps of Accretion Disks: The Effective Temperature and Flare of the Disk in the Dwarf Nova Z Chamaeleontis. *Edward L. Robinson, Janet H. Wood, & Richard A. Wade.* 514, 952 (1999)

STARS: BINARIES: CLOSE

The Distribution of Collisionally Induced Blue Stragglers in the Color-Magnitude Diagram. *Alison Sills & Charles D. Bailyn.* 513, 428 (1999)

Line-driven Ablation and Wind Tilting by External Irradiation. *K. G. Gayley, S. P. Owocki, & S. R. Cranmer.* 513, 442 (1999)

Hard X-Ray Variability of the Black Hole Candidate GRO J0422+32 during Its 1992 Outburst. *F. van der Hooft, C. Kouveliotou, J. van Paradijs, W. S. Paciesas, W. H. G. Lewin, M. van der Klis, D. J. Crary, M. H. Finger, B. A. Harmon, & S. N. Zhang.* 513, 477 (1999)

A New Estimation of Mass Accumulation Efficiency in Helium Shell Flashes toward Type Ia Supernova Explosions. *Mariko Kato & Izumi Hachisu.* 513, L41 (1999)

Could 2S 0114+650 Be a Magnetar? *X.-D. Li & E. P. J. van den Heuvel.* 513, L45 (1999)

A Population of Faint Nontransient Low-Mass Black Hole Binaries. *Kristen Menou, Ramesh Narayan, & Jean-Pierre Lasota.* 513, 811 (1999)

Bursts from GS 1826−238: A Clocked Thermonuclear Flashes Generator. *P. Ubertini, A. Bazzano, M. Cocchi, L. Natalucci, J. Heise, J. M. Muller, & J. J. M. in 't Zand.* 514, L27 (1999)

A Numerical Study of Normal Modes of Rotating Neutron Star Models by the Cowling Approximation. *Shin'ichirou Yoshida & Yoshiharu Eriguchi.* 515, 414 (1999)

Hubble Space Telescope WFPC2 Imaging of XZ Tauri: Time Evolution of a Herbig-Haro Bow Shock. *John E. Krist, Karl R. Stapelfeldt, Christopher J. Burrows, J. Jeff Hester, Alan M. Watson, Gilda E. Ballester, John T. Clarke, David Crisp, Robin W. Evans, John S. Gallegher III, Richard E. Griffiths, John G. Hoessel, Jon A. Holtzman, Jeremy R. Mould, Paul A. Scowen, & John T. Trauger.* 515, L35 (1999)

Extreme Ultraviolet Explorer Photometry of RS Canum Venaticorum Systems: Four Flaring Megaseconds. *Rachel A. Osten & Alexander Brown.* 515, 746 (1999)

VLA Observations of the Interacting-Wind Binary System WR 147. *M. E. Contreras & L. F. Rodríguez.* 515, 762 (1999)

STARS: BINARIES: ECLIPSING

Origin of the Transient, Unpulsed Radio Emission from the PSR B1259−63 Binary System. *Lewis Ball, Andrew Melatos, Simon Johnston, & Olaf Skjæraasen.* 514, L39 (1999)

Application of Realistic Model Atmospheres to Eclipse Maps of Accretion Disks: The Effective Temperature and Flare of the Disk in the Dwarf Nova Z Chamaeleontis. *Edward L. Robinson, Janet H. Wood, & Richard A. Wade.* 514, 952 (1999)

V2301 Ophiuchi: An X-Ray–bright Eclipsing AM Herculis Object. *Thomas Y. Steiman-Cameron & James N. Imamura.* 515, 404 (1999)

STARS: BINARIES: GENERAL

Hubble Space Telescope Observations of the Central-Cusp Globular Cluster NGC 6752: the Effect of Binary Stars on the Luminosity Function in the Core. *Eric P. Rubenstein & Charles D. Bailyn.* 513, L33 (1999)

Frame Dragging and Other Precessional Effects in Black Hole Pulsar Binaries. *N. Wex & S. M. Kopeikin.* 514, 388 (1999)

Accretion Disk Reversal and the Spin-up/Spin-down of Accreting Pulsars. *James R. Murray, Martijn de Kool, & Jianke Li.* 515, 738 (1999)

STARS: BINARIES: SPECTROSCOPIC

The Visual Orbit of ι Pegasi. *A. F. Boden, C. D. Koresko, G. T. van Belle, M. M. Colavita, P. J. Dumont, J. Gubler, S. R. Kulkarni, B. F. Lane, D. Mobley, M. Shao, J. K. Wallace, (The PTI Collaboration), & G. W. Henry.* 515, 356 (1999)

STARS: BINARIES: SYMBIOTIC

Toward the Evidence of the Accretion Disk Emission in the Symbiotic Star RR Telescopii. *Hee-Won Lee & Myeong-Gu Park.* 515, L89 (1999)

STARS: BINARIES: VISUAL

Spectral, Photometric, and Polarimetric Study of Visual Binary COU 14. *V. S. Tamazian, J. A. Docobo, & N. D. Melikian.* 513, 933 (1999)

STARS: BLUE STRAGGLERS

The Distribution of Collisionally Induced Blue Stragglers in the Color-Magnitude Diagram. *Alison Sills & Charles D. Bailyn.* 513, 428 (1999)

STARS: CARBON

The SiC Problem: Astronomical and Meteoritic Evidence. *A. K. Speck, A. M. Hofmeister, & M. J. Barlow.* 513, L87 (1999)

STARS: CEPHEIDS

The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XIV. The Cepheids in NGC 1365. *N. A. Silbermann, Paul Harding, Laura Ferrarese, Peter B. Stetson, Barry F. Madore, Robert C Kennicutt, Jr., Wendy L. Freedman, Jeremy R. Mould, Fabio Bresolin, Holland Ford, Brad K. Gibson, John A. Graham, Mingsheng Han, John G. Hoessel, Robert J. Hill, John Huchra, Shaun M. G. Hughes, Garth D. Illingworth, Dan Kelson, Lucas Macri, Randy Phelps, Daya Rawson, Shoko Sakai, & Anne Turner.* 515, 1 (1999)

STARS: CIRCUMSTELLAR MATTER

Relativistic and Newtonian Core-Shell Models: Analytical and Numerical Results. *Werner M. Vieira & Patricio S. Letelier.* 513, 383 (1999)

Discovery of Two New, Carbon-rich Proto–Planetary Nebulae: IRAS Z02229+6208 and IRAS 07430+1115. *Bruce J. Hrivnak & Sun Kwok.* 513, 869 (1999)

NICMOS Imaging of the HR 4796A Circumstellar Disk. *Glenn Schneider, Bradford A. Smith, E. E. Becklin, David W. Koerner, Roland Meier, Dean C. Hines, Patrick J. Lowrance, Richard J. Terrile, Rodger I. Thompson, & Marcia Rieke.* 513, L127 (1999)

Sub–Astronomical Unit Structure of the Near-Infrared Emission from AB Aurigae. *R. Millan-Gabet, F. P. Schloerb, W. A. Traub, F. Malbet, J. P. Berger, & J. D. Bregman.* 513, L131 (1999)

On the Azimuthal Structure of Thermal Convection in Circumstellar Disks. *H. H. Klahr, Th. Henning, & W. Kley.* 514, 325 (1999)

Origin of the Transient, Unpulsed Radio Emission from the PSR B1259−63 Binary System. *Lewis Ball, Andrew Melatos, Simon Johnston, & Olaf Skjæraasen.* 514, L39 (1999)

The "Water-Fountain Nebula" IRAS 16342−3814: *Hubble Space Telescope*/Very Large Array Study of a Bipolar Protoplanetary Nebula. *Raghvendra Sahai, Peter te Lintel Hekkert, Mark Morris, Albert Zijlstra, & Lauren Likkel.* 514, L115 (1999)

First Observations of an R Coronae Borealis Star with the Space Telescope Imaging Spectrograph: RY Sagittarii near Maximum Light. *Geoffrey C. Clayton, T. R. Ayres, Warrick A. Lawson, John S. Drilling, P. Woitke, & Martin Asplund.* 515, 351 (1999)

Hubble Space Telescope WFPC2 Imaging of XZ Tauri: Time Evolution of a Herbig-Haro Bow Shock. *John E. Krist, Karl R. Stapelfeldt, Christopher J. Burrows, J. Jeff Hester, Alan M. Watson, Gilda E. Ballester, John T. Clarke, David Crisp, Robin W. Evans, John S. Gallegher III, Richard E. Griffiths, John G. Hoessel, Jon A. Holtzman, Jeremy R. Mould, Paul A. Scowen, & John T. Trauger.* 515, L35 (1999)

Photodissociation Region Models of Photoevaporating Circumstellar Disks and Application to the Proplyds in Orion. *H. Störzer & D. Hollenbach.* 515, 669 (1999)

L1448 IRS 2: A HIRES-identified Class 0 Protostar. *JoAnn O'Linger, Grace Wolf-Chase, Mary Barsony, & Derek Ward-Thompson.* 515, 696 (1999)

Dust around First-Ascent Red Giants. *M. Jura.* 515, 706 (1999)

STARS: CORONAE

Implications from Extreme-Ultraviolet Observations for Coronal Heating of Active Stars *Marc Audard, Manuel Güdel, & Edward F. Guinan.* 513, L53 (1999)

The Active Corona of HD 35850 (F8 V). *Marc Gagné, Jeff A. Valenti, Jeffrey L. Linsky, Gianpiero Tagliaferri, Stefano Covino, & Manuel Güdel.* 515, 423 (1999)

Rossi X-Ray Timing Explorer Observation of Cygnus X-1. III. Implications for Compton Corona and Advection-dominated Accretion Flow Models. *Michael A. Nowak, Jörn Wilms, Brian A. Vaughan, James B. Dove, & Mitchell C. Begelman.* 515, 726 (1999)

Extreme Ultraviolet Explorer Photometry of RS Canum Venaticorum Systems: Four Flaring Megaseconds. *Rachel A. Osten & Alexander Brown.* 515, 746 (1999)

Confined Disruption of a Three-dimensional Twisted Magnetic Flux Tube. *T. Amari & J. F. Luciani.* 515, L81 (1999)

STARS: EMISSION-LINE, BE

Sub–Astronomical Unit Structure of the Near-Infrared Emission from AB Aurigae. *R. Millan-Gabet, F. P. Schloerb, W. A. Traub, F. Malbet, J. P. Berger, & J. D. Bregman.* 513, L131 (1999)

Origin of the Transient, Unpulsed Radio Emission from the PSR B1259−63 Binary System. *Lewis Ball, Andrew Melatos, Simon Johnston, & Olaf Skjæraasen.* 514, L39 (1999)

STARS: EVOLUTION

The Distribution of Collisionally Induced Blue Stragglers in the Color-Magnitude Diagram. *Alison Sills & Charles D. Bailyn.* 513, 428 (1999)

Rotational Effects on the Dynamical Instability of Luminous Blue Variables. *Richard B. Stothers.* 513, 460 (1999)

Stellar Envelope Convection Calibrated by Radiation Hydrodynamics Simulations: Influence on Globular Cluster Isochrones. *Bernd Freytag & Maurizio Salaris.* 513, L49 (1999)

Evolution of 3–9 $M_{\odot}$ Stars for z = 0.001–0.03 and Metallicity Effects on Type Ia Supernovae. *Hideyuki Umeda, Ken'ichi Nomoto, Hitoshi Yamaoka, & Shinya Wanajo.* 513, 861 (1999)

Chemical Abundances of Planetary Nebulae in the Bulge and Disk of M31. *George H. Jacoby & Robin Ciardullo.* 515, 169 (1999)

On the Evolution of Stars that Form Electron-degenerate Cores Processed by Carbon Burning. V. Shell Convection Sustained by Helium Burning, Transient Neon Burning, Dredge-out, Urca Cooling, and Other Properties of an 11 $M_{\odot}$ Population I Model Star. *Claudio Ritossa, Enrique García-Berro, & Icko Iben, Jr.* 515, 381 (1999)

Toward the Evidence of the Accretion Disk Emission in the Symbiotic Star RR Telescopii. *Hee-Won Lee & Myeong-Gu Park.* 515, L89 (1999)

STARS: FLARE

Implications from Extreme-Ultraviolet Observations for Coronal Heating of Active Stars. *Marc Audard, Manuel Güdel, & Edward F. Guinan.* 513, L53 (1999)

Spectral, Photometric, and Polarimetric Study of Visual Binary COU 14. *V. S. Tamazian, J. A. Docobo, & N. D. Melikian.* 513, 933 (1999)

Using Temporal Variations of the Nonthermal Redshifted Ly*alpha* Emission to Deduce Properties of Proton Beams Injected into a Stellar Atmosphere. *Jeffrey W. Brosius & Bruce E. Woodgate.* 514, 430 (1999)

Confined Disruption of a Three-dimensional Twisted Magnetic Flux Tube. *T. Amari & J. F. Luciani.* 515, L81 (1999)

STARS: FORMATION

Envelope Structure of Deeply Embedded Young Stellar Objects in the Serpens Molecular Cloud. *Michiel R. Hogerheijde, Ewine F. van Dishoeck, Jante M. Salverda, & Geoffrey A. Blake.* 513, 350 (1999)

Discovery of an Extremely Young Accreting Protostar in Taurus. *P. André, F. Motte, & A. Bacmann.* 513, L57 (1999)

A High-Resolution Study of the Slowly Contracting, Starless Core L1544. *Jonathan P. Williams, Philip C. Myers, David J. Wilner, & James Di Francesco.* 513, L61 (1999)

The Synchrotron Jet from the H_2O Maser Source in W3(OH). *D. J. Wilner, M. J. Reid, & Karl M. Menten.* 513, 775 (1999)

Submillimeter Continuum Emission in the ρ Ophiuchi Molecular Cloud: Filaments, Arcs, and an Unidentified Far-Infrared Object. *Christine D. Wilson, Lorne W. Avery, Michel Fich, Doug Johnstone, Gilles Joncas, Lewis B. G. Knee, Henry E. Matthews, George F. Mitchell, Gerald H. Moriarty-Schieven, & Ralph E. Pudritz.* 513, L139 (1999)

Hot Gas and Dust in a Protostellar Cluster near W3(OH). *Friedrich Wyrowski, Peter Schilke, C. Malcolm Walmsley, & Karl M. Menten.* 514, L43 (1999)

Modeling the Radial Abundance Distribution of the Transition Galaxy NGC 1313. *Mercedes Mollá & Jean-René Roy.* 514, 781 (1999)

Ammonia Absorption toward the Ultracompact H II Regions G45.12+0.13 and G45.47+0.05. *Peter Hofner, Sarah Peterson, & Riccardo Cesaroni.* 514, 899 (1999)

Detection of the CN Zeeman Effect in Molecular Clouds. *Richard M. Crutcher, Thomas H. Troland, Bernard Lazareff, Gebriel Paubert, & Ilya Kazès.* 514, L121 (1999)

On the Mass of Population III Stars. *Fumitaka Nakamura & Masayuki Umemura.* 515, 239 (1999)

The Stellar Initial Mass Function from Random Sampling in Hierarchical Clouds. II. Statistical Fluctuations and a Mass Dependence for Starbirth Positions and Times. *Bruce G. Elmegreen.* 515, 323 (1999)

Testing the Relation between the Local and Cosmic Star Formation Histories. *Brian D. Fields.* 515, 603 (1999)

Photodissociation Region Models of Photoevaporating Circumstellar Disks and Application to the Proplyds in Orion. *H. Störzer & D. Hollenbach.* 515, 669 (1999)

The Interaction of a Strong Magnetic Field with a Cold Plasma: The Evolution of a Magnetic Bubble. *William I. Newman & Alice L. Newman.* 515, 685 (1999)

STARS: FUNDAMENTAL PARAMETERS

Evolutionary Stellar Population Synthesis at 2 Å Spectral Resolution. *A. Vazdekis.* 513, 224 (1999)

The Mode Change of the RR Lyrae Variable V79 in M3. *Christine M. Clement & Vitaly P. Goranskij.* 513, 767 (1999)

Structure and Evolution of Nearby Stars with Planets. I. Short-Period Systems. *Eric B. Ford, Frederic A. Rasio, & Alison Sills.* 514, 411 (1999)

On the Pulsation Mode of Mira Variables: Nonlinear Calculations Compared with Radius Observations. *A. Ya'ari & Y. Tuchman.* 514, L35 (1999)

The Visual Orbit of ι Pegasi. *A. F. Boden, C. D. Koresko, G. T. van Belle, M. M. Colavita, P. J. Dumont, J. Gubler, S. R. Kulkarni, B. F. Lane, D. Mobley, M. Shao, J. K. Wallace, (The PTI Collaboration), & G. W. Henry.* 515, 356 (1999)

The RR Lyrae Period-Amplitude Relation as a Clue to the Origin of the Oosterhoff Dichotomy. *Christine M. Clement & Ian Shelton.* 515, L85 (1999)

STARS: HORIZONTAL-BRANCH

The Mode Change of the RR Lyrae Variable V79 in M3. *Christine M. Clement & Vitaly P. Goranskij.* 513, 767 (1999)

The RR Lyrae Period-Amplitude Relation as a Clue to the Origin of the Oosterhoff Dichotomy. *Christine M. Clement & Ian Shelton.* 515, L85 (1999)

STARS: IMAGING

Subarcsecond Optical Imaging of Proto–Planetary Nebulae. *Bruce J. Hrivnak, Philip P. Langill, Kate Y. L. Su, & Sun Kwok.* 513, 421 (1999)

L1448 IRS 2: A HIRES-identified Class 0 Protostar. *JoAnn O'Linger, Grace Wolf-Chase, Mary Barsony, & Derek Ward-Thompson.* 515, 696 (1999)

STARS: INDIVIDUAL

Constellation Name: U Aquarii

Is U Aquarii a Thorne-Zytkow Object? *Andrew D. Vanture, Daniel Zucker, & George Wallerstein.* 514, 932 (1999)

Constellation Name: Aquila X-1

The Thermal X-Ray Spectra of Centaurus X-4, Aquila X-1, and 4U 1608−522 in Quiescence. *Robert E. Rutledge, Lars Bildsten, Edward F. Brown, George G. Pavlov, & Vyatcheslav E. Zavlin.* 514, 945 (1999)

Constellation Name: β Aquilae

Precise Spectropolarimetric Measurements of Magnetic Fields on Some Solar-like Stars. *S. I. Plachinda & T. N. Tarasova.* 514, 402 (1999)

Constellation Name: AB Aurigae

Sub–Astronomical Unit Structure of the Near-Infrared Emission from AB Aurigae. *R. Millan-Gabet, F. P. Schloerb, W. A. Traub, F. Malbet, J. P. Berger, & J. D. Bregman.* 513, L131 (1999)

Constellation Name: SS Aurigae

Hubble Space Telescope Fine Guidance Sensor Astrometric Parallaxes for Three Dwarf Novae: SS Aurigae, SS Cygni, and U Geminorum. *Thomas E. Harrison, Bernard J. McNamara, Paula Szkody, Barbara E. McArthur, G. F. Benedict, Arnold R. Klemola, & Ronald L. Gilliland.* 515, L93 (1999)

Constellation Name: α Canis Minoris

Precise Spectropolarimetric Measurements of Magnetic Fields on Some Solar-like Stars. *S. I. Plachinda & T. N. Tarasova.* 514, 402 (1999)

Constellation Name: 47 Cassiopeiae

Implications from Extreme-Ultraviolet Observations for Coronal Heating of Active Stars. *Marc Audard, Manuel Güdel, & Edward F. Guinan.* 513, L53 (1999)

Constellation Name: Centaurus X-4

The Thermal X-Ray Spectra of Centaurus X-4, Aquila X-1, and 4U 1608−522 in Quiescence. *Robert E. Rutledge, Lars Bildsten, Edward F. Brown, George G. Pavlov, & Vyatcheslav E. Zavlin.* 514, 945 (1999)

Constellation Name: Z Chamaeleontis

Application of Realistic Model Atmospheres to Eclipse Maps of Accretion Disks: The Effective Temperature and Flare of the Disk in the Dwarf Nova Z Chamaeleontis. *Edward L. Robinson, Janet H. Wood, & Richard A. Wade.* 514, 952 (1999)

Constellation Name: β Comae

Precise Spectropolarimetric Measurements of Magnetic Fields on Some Solar-like Stars. *S. I. Plachinda & T. N. Tarasova.* 514, 402 (1999)

Constellation Name: Cygnus X-1

X-Ray Shots of Cygnus X-1. *Y. X. Feng, T. P. Li, & L. Chen.* 514, 373 (1999)

Rossi X-Ray Timing Explorer Observation of Cygnus X-1. III. Implications for Compton Corona and Advection-dominated Accretion Flow Models. *Michael A. Nowak, Jörn Wilms, Brian A. Vaughan, James B. Dove, & Mitchell C. Begelman.* 515, 726 (1999)

Constellation Name: SS Cygni

Hubble Space Telescope Fine Guidance Sensor Astrometric Parallaxes for Three Dwarf Novae: SS Aurigae, SS Cygni, and U Geminorum. *Thomas E. Harrison, Bernard J. McNamara, Paula Szkody, Barbara E. McArthur, G. F. Benedict, Arnold R. Klemola, & Ronald L. Gilliland.* 515, L93 (1999)

Constellation Name: EK Draconis

Implications from Extreme-Ultraviolet Observations for Coronal Heating of Active Stars. *Marc Audard, Manuel Güdel, & Edward F. Guinan.* 513, L53 (1999)

Constellation Name: U Geminorum

Hubble Space Telescope Fine Guidance Sensor Astrometric Parallaxes for Three Dwarf Novae: SS Aurigae, SS Cygni, and U Geminorum. *Thomas E. Harrison, Bernard J. McNamara, Paula Szkody, Barbara E. McArthur, G. F. Benedict, Arnold R. Klemola, & Ronald L. Gilliland.* 515, L93 (1999)

Constellation Name: ζ Herculis

Precise Spectropolarimetric Measurements of Magnetic Fields on Some Solar-like Stars. *S. I. Plachinda & T. N. Tarasova.* 514, 402 (1999)

Constellation Name: AM Herculis

The Far-Ultraviolet Spectrum and Short-Timescale Variability of AM Herculis from Observations with the Hopkins Ultraviolet Telescope. *Bradford W. Greeley, William P. Blair, Knox S. Long, & John C. Raymond.* 513, 491 (1999)

Constellation Name: V2301 Ophiuchi

V2301 Ophiuchi: An X-Ray–bright Eclipsing AM Herculis Object. *Thomas Y. Steiman-Cameron & James N. Imamura.* 515, 404 (1999)

Constellation Name: ι Pegasi

The Visual Orbit of ι Pegasi. *A. F. Boden, C. D. Koresko, G. T. van Belle, M. M. Colavita, P. J. Dumont, J. Gubler, S. R. Kulkarni, B. F. Lane, D. Mobley, M. Shao, J. K. Wallace, (The PTI Collaboration), & G. W. Henry.* 515, 356 (1999)

Constellation Name: RY Sagittarii

First Observations of an R Coronae Borealis Star with the Space Telescope Imaging Spectrograph: RY Sagittarii near Maximum Light. *Geoffrey C. Clayton, T. R. Ayres, Warrick A. Lawson, John S. Drilling, P. Woitke, & Martin Asplund.* 515, 351 (1999)

Constellation Name: XZ Tauri

Hubble Space Telescope WFPC2 Imaging of XZ Tauri: Time Evolution of a Herbig-Haro Bow Shock. *John E. Krist, Karl R. Stapelfeldt, Christopher J. Burrows, J. Jeff Hester, Alan M. Watson, Gilda E. Ballester, John T. Clarke, David Crisp, Robin W. Evans, John S. Gallegher III, Richard E. Griffiths, John G. Hoessel, Jon A. Holtzman, Jeremy R. Mould, Paul A. Scowen, & John T. Trauger.* 515, L35 (1999)

Bright Star Number: HR 4796A

NICMOS Imaging of the HR 4796A Circumstellar Disk. *Glenn Schneider, Bradford A. Smith, E. E. Becklin, David W. Koerner, Roland Meier, Dean C. Hines, Patrick J. Lowrance, Richard J. Terrile, Rodger I. Thompson, & Marcia Rieke.* 513, L127 (1999)

Henry Draper Number: HD 35850

The Active Corona of HD 35850 (F8 V). *Marc Gagné, Jeff A. Valenti, Jeffrey L. Linsky, Gianpiero Tagliaferri, Stefano Covino, & Manuel Güdel.* 515, 423 (1999)

Alphanumeric: COU 14

Spectral, Photometric, and Polarimetric Study of Visual Binary COU 14. *V. S. Tamazian, J. A. Docobo, & N. D. Melikian.* 513, 933 (1999)

Alphanumeric: 1E 161348−5055

X-Ray Variability from the Compact Source in the Supernova Remnant RCW 103. *E. V. Gotthelf, R. Petre, & G. Vasisht.* 514, L107 (1999)

Alphanumeric: GRO J0422+32

Hard X-Ray Variability of the Black Hole Candidate GRO J0422+32 during Its 1992 Outburst. *F. van der Hooft, C. Kouveliotou, J. van Paradijs, W. S. Paciesas, W. H. G. Lewin, M. van der Klis, D. J. Crary, M. H. Finger, B. A. Harmon, & S. N. Zhang.* 513, 477 (1999)

Alphanumeric: GRS 1915+105

Variable-Frequency Quasi-periodic Oscillations from the Galactic Microquasar GRS 1915+105. *Craig B. Markwardt, Jean H. Swank, & Ronald E. Taam.* 513, L37 (1999)

Alphanumeric: GS 1826−238

Bursts from GS 1826−238: A Clocked Thermonuclear Flashes Generator. *P. Ubertini, A. Bazzano, M. Cocchi, L. Natalucci, J. Heise, J. M. Muller, & J. J. M. in 't Zand.* 514, L27 (1999)

Alphanumeric: IRAS 16594−4656

Infrared Space Observatory Observations of IRAS 16594−4656: A New Proto–Planetary Nebula with a Strong 21 Micron Dust Feature. *Pedro García-Lario, Arturo Manchado, Ana Ulla, & Minia Manteiga.* 513, 941 (1999)

Alphanumeric: L1448 IRS 2

L1448 IRS 2: A HIRES-identified Class 0 Protostar. *JoAnn O'Linger, Grace Wolf-Chase, Mary Barsony, & Derek Ward-Thompson.* 515, 696 (1999)

Alphanumeric: RX J2117+3412

Changes and Absorption Features in the Ultraviolet Spectrum of the PG 1159–Type Central Star RX J2117+3412. *Walter A. Feibelman.* 513, 947 (1999)

Alphanumeric: SGR 1900+14

A Giant Outburst from SGR 1900+14 Observed with the *BeppoSAX* Gamma-Ray Burst Monitor. *M. Feroci, F. Frontera, E. Costa, L. Amati, M. Tavani, M. Rapisarda, & M. Orlandini.* 515, L9 (1999)

Alphanumeric: 4U 1608−52

Discovery of Microsecond Soft Lags in the X-Ray Emission of the Atoll Source 4U 1636−536. *Philip Kaaret, Santina Piraino, Eric C. Ford, & Andrea Santangelo.* 514, L31 (1999)

Alphanumeric: 4U 1608−522

The Thermal X-Ray Spectra of Centaurus X-4, Aquila X-1, and 4U 1608−522 in Quiescence. *Robert E. Rutledge, Lars Bildsten, Edward F. Brown, George G. Pavlov, & Vyatcheslav E. Zavlin.* 514, 945 (1999)

Alphanumeric: 4U 1636−536

Discovery of Microsecond Soft Lags in the X-Ray Emission of the Atoll Source 4U 1636−536. *Philip Kaaret, Santina Piraino, Eric C. Ford, & Andrea Santangelo.* 514, L31 (1999)

Alphanumeric: WR 147

VLA Observations of the Interacting-Wind Binary System WR 147. *M. E. Contreras & L. F. Rodríguez.* 515, 762 (1999)

Alphanumeric: XTE J2123−058

Discovery of Twin Kilohertz Quasi-periodic Oscillations in the High Galactic Latitude X-Ray Transient XTE J2123−058. *Jeroen Homan, Mariano Mendez, Rudy Wijnands, Michiel van der Klis, & Jan van Paradijs.* 513, L119 (1999)

STARS: INTERIORS

The Distribution of Collisionally Induced Blue Stragglers in the Color-Magnitude Diagram. *Alison Sills & Charles D. Bailyn.* 513, 428 (1999)

Evolution of Proto–Neutron Stars. *J. A. Pons, S. Reddy, M. Prakash, J. M. Lattimer, & J. A. Miralles.* 513, 780 (1999)

The Quadrupole Oscillations of Strange Quark Stars. *C. W. Yip, M.-C. Chu, & P. T. Leung.* 513, 849 (1999)

Evolution of 3–9 $M_{\odot}$ Stars for z = 0.001–0.03 and Metallicity Effects on Type Ia Supernovae. *Hideyuki Umeda, Ken'ichi Nomoto, Hitoshi Yamaoka, & Shinya Wanajo.* 513, 861 (1999)

Structure and Evolution of Nearby Stars with Planets. I. Short-Period Systems. *Eric B. Ford, Frederic A. Rasio, & Alison Sills.* 514, 411 (1999)

On the Mass of Population III Stars. *Fumitaka Nakamura & Masayuki Umemura.* 515, 239 (1999)

On the Evolution of Stars that Form Electron-degenerate Cores Processed by Carbon Burning. V. Shell Convection Sustained by Helium Burning, Transient Neon Burning, Dredge-out, Urca Cooling, and Other Properties of an 11 $M_{\odot}$ Population I Model Star. *Claudio Ritossa, Enrique García-Berro, & Icko Iben, Jr.* 515, 381 (1999)

A Numerical Study of Normal Modes of Rotating Neutron Star Models by the Cowling Approximation. *Shin'ichirou Yoshida & Yoshiharu Eriguchi.* 515, 414 (1999)

STARS: KINEMATICS

The Distribution of Collisionally Induced Blue Stragglers in the Color-Magnitude Diagram. *Alison Sills & Charles D. Bailyn.* 513, 428 (1999)

STARS: LATE-TYPE

Precise Spectropolarimetric Measurements of Magnetic Fields on Some Solar-like Stars. *S. I. Plachinda & T. N. Tarasova.* 514, 402 (1999)

On the Pulsation Mode of Mira Variables: Nonlinear Calculations Compared with Radius Observations. *A. Ya'ari & Y. Tuchman.* 514, L35 (1999)

The Active Corona of HD 35850 (F8 V). *Marc Gagné, Jeff A. Valenti, Jeffrey L. Linsky, Gianpiero Tagliaferri, Stefano Covino, & Manuel Güdel.* 515, 423 (1999)

Dust around First-Ascent Red Giants. *M. Jura.* 515, 706 (1999)

Extreme Ultraviolet Explorer Photometry of RS Canum Venaticorum Systems: Four Flaring Megaseconds. *Rachel A. Osten & Alexander Brown.* 515, 746 (1999)

STARS: LOW-MASS, BROWN DWARFS

Envelope Structure of Deeply Embedded Young Stellar Objects in the Serpens Molecular Cloud. *Michiel R. Hogerheijde, Ewine F. van Dishoeck, Jante M. Salverda, & Geoffrey A. Blake.* 513, 350 (1999)

Reflected Spectra and Albedos of Extrasolar Giant Planets. I. Clear and Cloudy Atmospheres. *Mark S. Marley, Christopher Gelino, Denise Stephens, Jonathan I. Lunine, & Richard Freedman.* 513, 879 (1999)

STARS: LUMINOSITY FUNCTION, MASS FUNCTION

Hubble Space Telescope Observations of the Central-Cusp Globular Cluster NGC 6752: the Effect of Binary Stars on the Luminosity Function in the Core. *Eric P. Rubenstein & Charles D. Bailyn.* 513, L33 (1999)

Dark Matter and the Chemical Evolution of Irregular Galaxies. *L. Carigi, P. Colín, & M. Peimbert.* 514, 787 (1999)

The Stellar Initial Mass Function from Random Sampling in Hierarchical Clouds. II. Statistical Fluctuations and a Mass Dependence for Starbirth Positions and Times. *Bruce G. Elmegreen.* 515, 323 (1999)

Testing the Relation between the Local and Cosmic Star Formation Histories. *Brian D. Fields.* 515, 603 (1999)

STARS: MAGNETIC FIELDS

The Far-Ultraviolet Spectrum and Short-Timescale Variability of AM Herculis from Observations with the Hopkins Ultraviolet Telescope. *Bradford W. Greeley, William P. Blair, Knox S. Long, & John C. Raymond.* 513, 491 (1999)

Disk Accretion onto Magnetized Neutron Stars: The Inner Disk Radius and Fastness Parameter. *X.-D. Li & Z.-R. Wang.* 513, 845 (1999)

Magnetic Propeller Outflows. *R. V. E. Lovelace, M. M. Romanova, & G. S. Bisnovatyi-Kogan.* 514, 368 (1999)

Precise Spectropolarimetric Measurements of Magnetic Fields on Some Solar-like Stars. *S. I. Plachinda & T. N. Tarasova.* 514, 402 (1999)

Confined Disruption of a Three-dimensional Twisted Magnetic Flux Tube. *T. Amari & J. F. Luciani.* 515, L81 (1999)

STARS: MASS LOSS

Subarcsecond Optical Imaging of Proto–Planetary Nebulae. *Bruce J. Hrivnak, Philip P. Langill, Kate Y. L. Su, & Sun Kwok.* 513, 421 (1999)

Line-driven Ablation and Wind Tilting by External Irradiation. *K. G. Gayley, S. P. Owocki, & S. R. Cranmer.* 513, 442 (1999)

A New Estimation of Mass Accumulation Efficiency in Helium Shell Flashes toward Type Ia Supernova Explosions. *Mariko Kato & Izumi Hachisu.* 513, L41 (1999)

Wind Inhomogeneities in Wolf-Rayet Stars. II. Investigation of Emission-Line Profile Variations. *Sébastien Lépine & Anthony F. J. Moffat.* 514, 909 (1999)

The "Water-Fountain Nebula" IRAS 16342−3814: *Hubble Space Telescope*/Very Large Array Study of a Bipolar Protoplanetary Nebula. *Raghvendra Sahai, Peter te Lintel Hekkert, Mark Morris, Albert Zijlstra, & Lauren Likkel.* 514, L115 (1999)

The Circumstellar Extinction of Planetary Nebulae. *Robin Ciardullo & George H. Jacoby.* 515, 191 (1999)

VLA Observations of the Interacting-Wind Binary System WR 147. *M. E. Contreras & L. F. Rodríguez.* 515, 762 (1999)

STARS: NEUTRON

Relativistic and Newtonian Core-Shell Models: Analytical and Numerical Results. *Werner M. Vieira & Patricio S. Letelier.* 513, 383 (1999)

Rossi X-Ray Timing Explorer Observations of the Anomalous Pulsar 4U 0142+61. *Colleen A. Wilson, Stefan Dieters, Mark H. Finger, D. Matthew Scott, & Jan van Paradijs.* 513, 464 (1999)

Could 2S 0114+650 Be a Magnetar? *X.-D. Li & E. P. J. van den Heuvel.* 513, L45 (1999)

Evolution of Proto–Neutron Stars. *J. A. Pons, S. Reddy, M. Prakash, J. M. Lattimer, & J. A. Miralles.* 513, 780 (1999)

Relativistic Precession around Rotating Neutron Stars: Effects Due to Frame Dragging and Stellar Oblateness. *Sharon M. Morsink & Luigi Stella.* 513, 827 (1999)

Disk Accretion onto Magnetized Neutron Stars: The Inner Disk Radius and Fastness Parameter. *X.-D. Li & Z.-R. Wang.* 513, 845 (1999)

The Quadrupole Oscillations of Strange Quark Stars. *C. W. Yip, M.-C. Chu, & P. T. Leung.* 513, 849 (1999)

Rossi X-Ray Timing Explorer Observation of PSR B1706−44 and Implications for Theoretical Models of Pulsar Emission. *A. Ray, A. K. Harding, & M. Strickman.* 513, 919 (1999)

Discovery of Twin Kilohertz Quasi-periodic Oscillations in the High Galactic Latitude X-Ray Transient XTE J2123−058. *Jeroen Homan, Mariano Mendez, Rudy Wijnands, Michiel van der Klis, & Jan van Paradijs.* 513, L119 (1999)

Discovery of Microsecond Soft Lags in the X-Ray Emission of the Atoll Source 4U 1636−536. *Philip Kaaret, Santina Piraino, Eric C. Ford, & Andrea Santangelo.* 514, L31 (1999)

The Broadband Power Spectra of X-Ray Binaries. *Rudy Wijnands & Michiel van der Klis.* 514, 939 (1999)

The Thermal X-Ray Spectra of Centaurus X-4, Aquila X-1, and 4U 1608−522 in Quiescence. *Robert E. Rutledge, Lars Bildsten, Edward F. Brown, George G. Pavlov, & Vyatcheslav E. Zavlin.* 514, 945 (1999)

X-Ray Variability from the Compact Source in the Supernova Remnant RCW 103. *E. V. Gotthelf, R. Petre, & G. Vasisht.* 514, L107 (1999)

X-Ray Novae, Event Horizons, and the Exponential Metric. *Stanley L. Robertson.* 515, 365 (1999)

A Numerical Study of Normal Modes of Rotating Neutron Star Models by the Cowling Approximation. *Shin'ichirou Yoshida & Yoshiharu Eriguchi.* 515, 414 (1999)

A Giant Outburst from SGR 1900+14 Observed with the *BeppoSAX* Gamma-Ray Burst Monitor. *M. Feroci, F. Frontera, E. Costa, L. Amati, M. Tavani, M. Rapisarda, & M. Orlandini.* 515, L9 (1999)

Evidence for Antipodal Hot Spots during X-Ray Bursts from 4U 1636−536. *M. Coleman Miller.* 515, L77 (1999)

STARS: NOVAE, CATACLYSMIC VARIABLES

The Far-Ultraviolet Spectrum and Short-Timescale Variability of AM Herculis from Observations with the Hopkins Ultraviolet Telescope. *Bradford W. Greeley, William P. Blair, Knox S. Long, & John C. Raymond.* 513, 491 (1999)

A New Estimation of Mass Accumulation Efficiency in Helium Shell Flashes toward Type Ia Supernova Explosions. *Mariko Kato & Izumi Hachisu.* 513, L41 (1999)

Application of Realistic Model Atmospheres to Eclipse Maps of Accretion Disks: The Effective Temperature and Flare of the Disk in the Dwarf Nova Z Chamaeleontis. *Edward L. Robinson, Janet H. Wood, & Richard A. Wade.* 514, 952 (1999)

X-Ray Novae, Event Horizons, and the Exponential Metric. *Stanley L. Robertson.* 515, 365 (1999)

V2301 Ophiuchi: An X-Ray–bright Eclipsing AM Herculis Object. *Thomas Y. Steiman-Cameron & James N. Imamura.* 515, 404 (1999)

Hubble Space Telescope Fine Guidance Sensor Astrometric Parallaxes for Three Dwarf Novae: SS Aurigae, SS Cygni, and U Geminorum. *Thomas E. Harrison, Bernard J. McNamara, Paula Szkody, Barbara E. McArthur, G. F. Benedict, Arnold R. Klemola, & Ronald L. Gilliland.* 515, L93 (1999)

STARS: OSCILLATIONS

Rotational Effects on the Dynamical Instability of Luminous Blue Variables. *Richard B. Stothers.* 513, 460 (1999)

Resonance in PSR B1257+12 Planetary System. *Maciej Konacki, Andrzej J. Maciejewski, & Alex Wolszczan.* 513, 471 (1999)

Variable-Frequency Quasi-periodic Oscillations from the Galactic Microquasar GRS 1915+105. *Craig B. Markwardt, Jean H. Swank, & Ronald E. Taam.* 513, L37 (1999)

The Mode Change of the RR Lyrae Variable V79 in M3. *Christine M. Clement & Vitaly P. Goranskij.* 513, 767 (1999)

The Quadrupole Oscillations of Strange Quark Stars. *C. W. Yip, M.-C. Chu, & P. T. Leung.* 513, 849 (1999)

On the Pulsation Mode of Mira Variables: Nonlinear Calculations Compared with Radius Observations. *A. Ya'ari & Y. Tuchman.* 514, L35 (1999)

A Numerical Study of Normal Modes of Rotating Neutron Star Models by the Cowling Approximation. *Shin'ichirou Yoshida & Yoshiharu Eriguchi.* 515, 414 (1999)

STARS: PLANETARY SYSTEMS

Resonance in PSR B1257+12 Planetary System. *Maciej Konacki, Andrzej J. Maciejewski, & Alex Wolszczan.* 513, 471 (1999)

Reflected Spectra and Albedos of Extrasolar Giant Planets. I. Clear and Cloudy Atmospheres. *Mark S. Marley, Christopher Gelino, Denise Stephens, Jonathan I. Lunine, & Richard Freedman.* 513, 879 (1999)

NICMOS Imaging of the HR 4796A Circumstellar Disk. *Glenn Schneider, Bradford A. Smith, E. E. Becklin, David W. Koerner, Roland Meier, Dean C. Hines, Patrick J. Lowrance, Richard J. Terrile, Rodger I. Thompson, & Marcia Rieke.* 513, L127 (1999)

Tidally Induced Gap Formation in Protostellar Disks: Gap Clearing and Suppression of Protoplanetary Growth. *G. Bryden, Xingming Chen, D. N. C. Lin, Richard P. Nelson, & John C. B. Papaloizou.* 514, 344 (1999)

Structure and Evolution of Nearby Stars with Planets. I. Short-Period Systems. *Eric B. Ford, Frederic A. Rasio, & Alison Sills.* 514, 411 (1999)

Magnetorotational Instability in Protoplanetary Disks. I. On the Global Stability of Weakly Ionized Disks with Ohmic Dissipation. *Takayoshi Sano & Shoken M. Miyama.* 515, 776 (1999)

STARS: POPULATION II

Hubble Space Telescope Observations of the Central-Cusp Globular Cluster NGC 6752: the Effect of Binary Stars on the Luminosity Function in the Core. *Eric P. Rubenstein & Charles D. Bailyn.* 513, L33 (1999)

Stellar Envelope Convection Calibrated by Radiation Hydrodynamics Simulations: Influence on Globular Cluster Isochrones. *Bernd Freytag & Maurizio Salaris.* 513, L49 (1999)

A Model for Calculating the Abundances of Neutron-Capture Elements in Metal-poor Stars. *Bo Zhang, Ji Li, Caixia Zhang, Yanchun Liang, & Qiuhe Peng.* 513, 910 (1999)

STARS: POST–ASYMPTOTIC GIANT BRANCH

Discovery of Two New, Carbon-rich Proto–Planetary Nebulae: IRAS Z02229+6208 and IRAS 07430+1115. *Bruce J. Hrivnak & Sun Kwok.* 513, 869 (1999)

STARS: PRE–MAIN-SEQUENCE

The Interstellar 4.62 Micron Band. *Y. J. Pendleton, A. G. G. M. Tielens, A. T. Tokunaga, & M. P. Bernstein.* 513, 294 (1999)

Envelope Structure of Deeply Embedded Young Stellar Objects in the Serpens Molecular Cloud. *Michiel R. Hogerheijde, Ewine F. van Dishoeck, Jante M. Salverda, & Geoffrey A. Blake.* 513, 350 (1999)

Sub–Astronomical Unit Structure of the Near-Infrared Emission from AB Aurigae. *R. Millan-Gabet, F. P. Schloerb, W. A. Traub, F. Malbet, J. P. Berger, & J. D. Bregman.* 513, L131 (1999)

Disk and Ouflow in Cepheus A–HW2: Interferometric SiO and HCO^+ Observations. *José F. Gómez, Anneila I. Sargent, José M. Torrelles, Paul T. P. Ho, Luis F. Rodríguez, Jorge Cantó, & Guido Garay.* 514, 287 (1999)

Hubble Space Telescope WFPC2 Imaging of XZ Tauri: Time Evolution of a Herbig-Haro Bow Shock. *John E. Krist, Karl R. Stapelfeldt, Christopher J. Burrows, J. Jeff Hester, Alan M. Watson, Gilda E. Ballester, John T. Clarke, David Crisp, Robin W. Evans, John S. Gallegher III, Richard E. Griffiths, John G. Hoessel, Jon A. Holtzman, Jeremy R. Mould, Paul A. Scowen, & John T. Trauger.* 515, L35 (1999)

L1448 IRS 2: A HIRES-identified Class 0 Protostar. *JoAnn O'Linger, Grace Wolf-Chase, Mary Barsony, & Derek Ward-Thompson.* 515, 696 (1999)

STARS: PULSARS: GENERAL

Relativistic Precession around Rotating Neutron Stars: Effects Due to Frame Dragging and Stellar Oblateness. *Sharon M. Morsink & Luigi Stella.* 513, 827 (1999)

Radio Pulses along the Galactic Plane. *David J. Nice.* 513, 927 (1999)

Long-Term Scintillation Studies of Pulsars. II. Refractive Effects and the Spectrum of Plasma Density Fluctuations. *N. D. Ramesh Bhat, Yashwant Gupta, & A. Pramesh Rao.* 514, 249 (1999)

Long-Term Scintillation Studies of Pulsars. III. Testing Theoretical Models of Refractive Scintillation. *N. D. Ramesh Bhat, A. Pramesh Rao, & Yashwant Gupta.* 514, 272 (1999)

Frame Dragging and Other Precessional Effects in Black Hole Pulsar Binaries. *N. Wex & S. M. Kopeikin.* 514, 388 (1999)

Is Coherence Essential to Account for Pulsar Radio Emission? *Bing Zhang, B. H. Hong, & G. J. Qiao.* 514, L111 (1999)

Multicomponent X-Ray Emissions from Regions near or on the Pulsar Surface. *K. S. Cheng & L. Zhang.* 515, 337 (1999)

The "Rabbit": A Potential Radio Counterpart of GeV J1417−6100. *Mallory S. E. Roberts, Roger W. Romani, Simon Johnston, & Anne J. Green.* 515, 712 (1999)

STARS: PULSARS: INDIVIDUAL

Alphanumeric: GX 1+4

Accretion Disk Reversal and the Spin-up/Spin-down of Accreting Pulsars. *James R. Murray, Martijn de Kool, & Jianke Li.* 515, 738 (1999)

Alphanumeric: PSR 0031−07

Competing Drifting Radio Subpulses in PSR B0031−07. *M. Vivekanand & B. C. Joshi.* 515, 398 (1999)

Alphanumeric: PSR B1257+12

Resonance in PSR B1257+12 Planetary System. *Maciej Konacki, Andrzej J. Maciejewski, & Alex Wolszczan.* 513, 471 (1999)

Alphanumeric: PSR B1259−63

Origin of the Transient, Unpulsed Radio Emission from the PSR B1259−63 Binary System. *Lewis Ball, Andrew Melatos, Simon Johnston, & Olaf Skjæraasen.* 514, L39 (1999)

Alphanumeric: PSR B1706−44

Rossi X-Ray Timing Explorer Observation of PSR B1706−44 and Implications for Theoretical Models of Pulsar Emission. *A. Ray, A. K. Harding, & M. Strickman.* 513, 919 (1999)

Alphanumeric: PSR J0045−7319

Frame Dragging and Other Precessional Effects in Black Hole Pulsar Binaries. *N. Wex & S. M. Kopeikin.* 514, 388 (1999)

Alphanumeric: PSR J1918+08

Radio Pulses along the Galactic Plane. *David J. Nice.* 513, 927 (1999)

Alphanumeric: 2S 0114+650

Could 2S 0114+650 Be a Magnetar? *X.-D. Li & E. P. J. van den Heuvel.* 513, L45 (1999)

Alphanumeric: 4U 0142+61

Rossi X-Ray Timing Explorer Observations of the Anomalous Pulsar 4U 0142+61. *Colleen A. Wilson, Stefan Dieters, Mark H. Finger, D. Matthew Scott, & Jan van Paradijs.* 513, 464 (1999)

STARS: ROTATION

Rotational Effects on the Dynamical Instability of Luminous Blue Variables. *Richard B. Stothers.* 513, 460 (1999)

Relativistic Precession around Rotating Neutron Stars: Effects Due to Frame Dragging and Stellar Oblateness. *Sharon M. Morsink & Luigi Stella.* 513, 827 (1999)

Disk Accretion onto Magnetized Neutron Stars: The Inner Disk Radius and Fastness Parameter. *X.-D. Li & Z.-R. Wang.* 513, 845 (1999)

A Numerical Study of Normal Modes of Rotating Neutron Star Models by the Cowling Approximation. *Shin'ichirou Yoshida & Yoshiharu Eriguchi.* 515, 414 (1999)

The Active Corona of HD 35850 (F8 V). *Marc Gagné, Jeff A. Valenti, Jeffrey L. Linsky, Gianpiero Tagliaferri, Stefano Covino, & Manuel Güdel.* 515, 423 (1999)

Accretion Disk Reversal and the Spin-up/Spin-down of Accreting Pulsars. *James R. Murray, Martijn de Kool, & Jianke Li.* 515, 738 (1999)

STARS: SUPERGIANTS

Discovery of Two New, Carbon-rich Proto–Planetary Nebulae: IRAS Z02229+6208 and IRAS 07430+1115. *Bruce J. Hrivnak & Sun Kwok.* 513, 869 (1999)

Evolutionary Synthesis Modeling of Red Supergiant Features in the Near-Infrared. *Livia Origlia, Jeffrey D. Goldader, Claus Leitherer, Daniel Schaerer, & Ernesto Oliva.* 514, 96 (1999)

On the Evolution of Stars that Form Electron-degenerate Cores Processed by Carbon Burning. V. Shell Convection Sustained by Helium Burning,

Transient Neon Burning, Dredge-out, Urca Cooling, and Other Properties of an 11 $M_\odot$ Population I Model Star. *Claudio Ritossa, Enrique García-Berro, & Icko Iben, Jr.* 515, 381 (1999)

STARS: SUPERNOVAE: GENERAL

Starburst-driven Mass Loss from Dwarf Galaxies: Efficiency and Metal Ejection. *Mordecai-Mark Mac Low & Andrea Ferrara.* 513, 142 (1999)

A New Estimation of Mass Accumulation Efficiency in Helium Shell Flashes toward Type Ia Supernova Explosions. *Mariko Kato & Izumi Hachisu.* 513, L41 (1999)

Evolution of 3–9 $M_\odot$ Stars for z = 0.001–0.03 and Metallicity Effects on Type Ia Supernovae. *Hideyuki Umeda, Ken'ichi Nomoto, Hitoshi Yamaoka, & Shinya Wanajo.* 513, 861 (1999)

Neutrino Fluence after *r*-Process Freezeout and Abundances of Te Isotopes in Presolar Diamonds. *Y. Z. Qian, P. Vogel, & G. J. Wasserburg.* 513, 956 (1999)

Stellar Metallicities and Type Ia Supernova Rates in the Early-Type Galaxy NGC 5846 from *ROSAT* and *ASCA* Observations. *A. Finoguenov, C. Jones, W. Forman, & L. David.* 514, 844 (1999)

Cosmological Constraints from Current Cosmic Microwave Background and Type Ia Supernova Data: A Brute Force, Eight-Parameter Analysis. *Max Tegmark.* 514, L69 (1999)

The Progenitor of the New COMPTEL/*ROSAT* Supernova Remnant in Vela. *Wan Chen & Neil Gehrels.* 514, L103 (1999)

On the Evolution of Stars that Form Electron-degenerate Cores Processed by Carbon Burning. V. Shell Convection Sustained by Helium Burning, Transient Neon Burning, Dredge-out, Urca Cooling, and Other Properties of an 11 $M_\odot$ Population I Model Star. *Claudio Ritossa, Enrique García-Berro, & Icko Iben, Jr.* 515, 381 (1999)

A Comparison of Metal Enrichment Histories in Rich Clusters and Individual Luminous Elliptical Galaxies. *Fabrizio Brighenti & William G. Mathews.* 515, 542 (1999)

The Interaction of a Strong Magnetic Field with a Cold Plasma: The Evolution of a Magnetic Bubble. *William I. Newman & Alice L. Newman.* 515, 685 (1999)

STARS: SUPERNOVAE: INDIVIDUAL

Alphanumeric: RCW 103

X-Ray Variability from the Compact Source in the Supernova Remnant RCW 103. *E. V. Gotthelf, R. Petre, & G. Vasisht.* 514, L107 (1999)

Alphanumeric: SN 1885

Hubble Space Telescope Images and Spectra of the Remnant of SN 1885 in M31. *Robert A. Fesen, Christopher L. Gerardy, Kevin M. McLin, & Andrew J. S. Hamilton.* 514, 195 (1999)

Alphanumeric: SN 1998bw

A Subrelativistic Shock Model for the Radio Emission of SN 1998bw. *Eli Waxman & Abraham Loeb.* 515, 721 (1999)

STARS: VARIABLES: CEPHEIDS

The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XIX. The Discovery of Cepheids in and a New Distance to NGC 3198. *Daniel D. Kelson, Garth D. Illingworth, Abhijit Saha, John A. Graham, Peter B. Stetson, Wendy L. Freedman, Robert C. Kennicutt, Jeremy R. Mould, Laura Ferrarese, John P. Huchra, Barry F. Madore, Charles F. Prosser, Fabio Bresolin, Holland C. Ford, Brad K. Gibson, John G. Hoessel, Shaun M. G. Hughes, Lucas M. Macri, Shoko Sakai, & N. A. Silbermann.* 514, 614 (1999)

The *Hubble Space Telescope* Key Project on the Extragalactic Distance Scale. XV. A Cepheid Distance to the Fornax Cluster and Its Implications. *Barry F. Madore, Wendy L. Freeman, N. Silbermann, Paul Harding, John Huchra, Jeremy R. Mould, John A. Graham, Laura Ferrarese, Brad K. Gibson, Mingsheng Han, John G. Hoessel, Shaun M. Hughes, Garth D. Illingworth, Randy Phelps, Shoko Sakai, & Peter Stetson.* 515, 29 (1999)

STARS: VARIABLES: OTHER

The Mode Change of the RR Lyrae Variable V79 in M3. *Christine M. Clement & Vitaly P. Goranskij.* 513, 767 (1999)

(R Coronae Borealis)

Is U Aquarii a Thorne-Zytkow Object? *Andrew D. Vanture, Daniel Zucker, & George Wallerstein.* 514, 932 (1999)

First Observations of an R Coronae Borealis Star with the Space Telescope Imaging Spectrograph: RY Sagittarii near Maximum Light. *Geoffrey C. Clayton, T. R. Ayres, Warrick A. Lawson, John S. Drilling, P. Woitke, & Martin Asplund.* 515, 351 (1999)

(Luminous Blue Variables)

Rotational Effects on the Dynamical Instability of Luminous Blue Variables. *Richard B. Stothers.* 513, 460 (1999)

(RR Lyrae)

The RR Lyrae Period-Amplitude Relation as a Clue to the Origin of the Oosterhoff Dichotomy. *Christine M. Clement & Ian Shelton.* 515, L85 (1999)

STARS: WHITE DWARFS

A New Estimation of Mass Accumulation Efficiency in Helium Shell Flashes toward Type Ia Supernova Explosions. *Mariko Kato & Izumi Hachisu.* 513, L41 (1999)

Evolution of 3–9 $M_\odot$ Stars for z = 0.001–0.03 and Metallicity Effects on Type Ia Supernovae. *Hideyuki Umeda, Ken'ichi Nomoto, Hitoshi Yamaoka, & Shinya Wanajo.* 513, 861 (1999)

Is Galactic Dark Matter White? *G. Chabrier.* 513, L103 (1999)

On the Nature of the Peculiar Hot Star in the Young Large Magellanic Cloud Cluster NGC 1818. *James Liebert.* 514, L25 (1999)

STARS: WOLF-RAYET

New Wolf-Rayet Galaxies with Detection of WC Stars. *J. H. Huang, Q. S. Gu, L. Ji, W. D. Li, J. Y. Wei, & W. Zheng.* 513, 215 (1999)

Massive Stars in the Quintuplet Cluster. *Donald F. Figer, Ian S. McLean, & Mark Morris.* 514, 202 (1999)

A Detailed Analysis of the Stellar and Nebular *IUE* Spectrum of the Peculiar "O VI Sequence" Planetary Nebula NGC 40. *Walter A. Feibelman.* 514, 296 (1999)

Wind Inhomogeneities in Wolf-Rayet Stars. II. Investigation of Emission-Line Profile Variations. *Sébastien Lépine & Anthony F. J. Moffat.* 514, 909 (1999)

VLA Observations of the Interacting-Wind Binary System WR 147. *M. E. Contreras & L. F. Rodríguez.* 515, 762 (1999)

SUN: ABUNDANCES

Sodium Tails of Comets: Na/O and Na/Si Abundances in Interplanetary Dust Particles. *Frans J. M. Rietmeijer.* 514, L125 (1999)

SUN: ACTIVITY

A Study of Microwave-selected Coronal Transient Brightenings. *A. Nindos, M. R. Kundu, & S. M. White.* 513, 983 (1999)

On the Solar-Cycle Modulation of the Homestake Solar Neutrino Capture Rate and the Shuffle Test. *Guenther Walther.* 513, 990 (1999)

Time Series of Solar Granulation Images. II. Evolution of Individual Granules. *J. Hirzberger, J. A. Bonet, M. Vázquez, & A. Hanslmeier.* 515, 441 (1999)

Fractal Analysis of Michelson Doppler Imager Magnetograms: A Contribution to the Study of Solar Active Regions. *N. Meunier.* 515, 801 (1999)

Magnetic and Radiative Variability of Solar Surface Structures. I. Image Decomposition and Magnetic-Intensity Mapping. *Karen L. Harvey & Oran R. White.* 515, 812 (1999)

Three-dimensional Stereoscopic Analysis of Solar Active Region Loops. I. *SOHO*/EIT Observations at Temperatures of (1.0–1.5) $\times 10^6$ K. *Markus J. Aschwanden, Jeffrey S. Newmark, Jean-Pierre Delaboudinière, Werner M. Neupert, J. A. Klimchuk, G. Allen Gary, Fabrice Portier-Fozzani, & Arik Zucker.* 515, 842 (1999)

SUN: ATMOSPHERE

Magnetic and Radiative Variability of Solar Surface Structures. I. Image Decomposition and Magnetic-Intensity Mapping. *Karen L. Harvey & Oran R. White.* 515, 812 (1999)

Absorption/Emission of Solar *p*-Modes: Michelson Doppler Interferometer/*SOHO* Observations. *Deborah Haber, Rekha Jain, & Ellen G. Zweibel.* 515, 832 (1999)

SUN: CHROMOSPHERE

Extreme-Ultraviolet Jets and Hα Surges in Solar Microflares. *Jongchul Chae, Jiong Qiu, Haimin Wang, & Philip R. Goode.* 513, L75 (1999)

Heating and Jet Formation by Hydrodynamic Cumulation in the Solar Atmosphere. *T. Tarbell, M. Ryutova, J. Covington, & A. Fludra.* 514, L47 (1999)

Photospheric Magnetic Reconnection and Canceling Magnetic Features on the Sun. *Yuri E. Litvinenko.* 515, 435 (1999)

SUN: CORONA

A Stable Filament Cavity with a Hot Core. *H. S. Hudson, L. W. Acton, K. L. Harvey, & D. E. McKenzie.* 513, L83 (1999)

Extension of the Polar Coronal Hole Boundary into Interplanetary Space. *Richard Woo, Shadia Rifai Habbal, Russell A. Howard, & Clarence M. Korendyke.* 513, 961 (1999)

Microscopic Nonthermal Plasma Notions of Coronal Loops in a Solar Active Region. *H. Hara & K. Ichimoto.* 513, 969 (1999)

A Study of Microwave-selected Coronal Transient Brightenings. *A. Nindos, M. R. Kundu, & S. M. White.* 513, 983 (1999)

Slow Magnetosonic Waves in Coronal Plumes. *L. Ofman, V. M. Nakariakov, & C. E. DeForest.* 514, 441 (1999)

Evolution of Eruptive Flares. II. The Occurrence of Locally Enhanced Resistivity. *Tetsuya Magara & Kazunari Shibata.* 514, 456 (1999)

Alfvén Wave Model of Spicules and Coronal Heating. *Takahiro Kudoh & Kazunari Shibata.* 514, 493 (1999)

Heating and Acceleration of the Solar Wind via Gravity Damping of Alfvén Waves. *Iolanda Cuseri, Dermott Mullan, Giancarlo Noci, & Giannina Poletto.* 514, 989 (1999)

Three-dimensional Stereoscopic Analysis of Solar Active Region Loops. I. *SOHO*/EIT Observations at Temperatures of (1.0–1.5) $\times 10^6$ K. *Markus J. Aschwanden, Jeffrey S. Newmark, Jean-Pierre Delaboudinière, Werner M. Neupert, J. A. Klimchuk, G. Allen Gary, Fabrice Portier-Fozzani, & Arik Zucker.* 515, 842 (1999)

SUN: FACULAE, PLAGES

Fractal Analysis of Michelson Doppler Imager Magnetograms: A Contribution to the Study of Solar Active Regions. *N. Meunier.* 515, 801 (1999)

SUN: FILAMENTS

A Stable Filament Cavity with a Hot Core. *H. S. Hudson, L. W. Acton, K. L. Harvey, & D. E. McKenzie.* 513, L83 (1999)

SUN: FLARES

Extreme-Ultraviolet Jets and Hα Surges in Solar Microflares. *Jongchul Chae, Jiong Qiu, Haimin Wang, & Philip R. Goode.* 513, L75 (1999)

Seismic Images of a Solar Flare. *A.-C. Donea, D. C. Braun, & C. Lindsey.* 513, L143 (1999)

Using Temporal Variations of the Nonthermal Redshifted Ly*alpha* Emission to Deduce Properties of Proton Beams Injected into a Stellar Atmosphere. *Jeffrey W. Brosius & Bruce E. Woodgate.* 514, 430 (1999)

Evolution of Eruptive Flares. II. The Occurrence of Locally Enhanced Resistivity. *Tetsuya Magara & Kazunari Shibata.* 514, 456 (1999)

The Solar Flare Soft X-Ray Differential Emission Measure and the Neupert Effect at Different Temperatures. *James M. McTiernan, George H. Fisher, & Peng Li.* 514, 472 (1999)

Hard and Soft X-Ray Observations of Occulted and Nonocculted Solar Limb Flares. *John T. Mariska & James M. McTiernan.* 514, 484 (1999)

SUN: FUNDAMENTAL PARAMETERS

Restoration and Photometry of Full-Disk Solar Images. *Stephen R. Walton & Dora G. Preminger.* 514, 959 (1999)

SUN: GRANULATION

Characteristic Scales of Photospheric Flows and Their Magnetic and Temperature Markers. *J. K. Lawrence, A. C. Cadavid, & A. A. Ruzmaikin.* 513, 506 (1999)

The Granular Magnetic Fields of the Quiet Sun. *Haosheng Lin & Thomas Rimmele.* 514, 448 (1999)

Time Series of Solar Granulation Images. II. Evolution of Individual Granules. *J. Hirzberger, J. A. Bonet, M. Vázquez, & A. Hanslmeier.* 515, 441 (1999)

SUN: INFRARED

The Granular Magnetic Fields of the Quiet Sun. *Haosheng Lin & Thomas Rimmele.* 514, 448 (1999)

SUN: INTERIOR

Helioseismic Images of an Active Region Complex. *D. C. Braun & C. Lindsey.* 513, L79 (1999)

Source of Solar Acoustic Modes. *R. Nigam & A. G. Kosovichev.* 514, L53 (1999)

SUN: MAGNETIC FIELDS

Characteristic Scales of Photospheric Flows and Their Magnetic and Temperature Markers. *J. K. Lawrence, A. C. Cadavid, & A. A. Ruzmaikin.* 513, 506 (1999)

Simulation of Magnetic Reconnection with Heat Conduction. *P. F. Chen, C. Fang, Y. H. Tang, & M. D. Ding.* 513, 516 (1999)

Extreme-Ultraviolet Jets and Hα Surges in Solar Microflares. *Jongchul Chae, Jiong Qiu, Haimin Wang, & Philip R. Goode.* 513, L75 (1999)

A Stable Filament Cavity with a Hot Core. *H. S. Hudson, L. W. Acton, K. L. Harvey, & D. E. McKenzie.* 513, L83 (1999)

Slow Magnetosonic Waves in Coronal Plumes. *L. Ofman, V. M. Nakariakov, & C. E. DeForest.* 514, 441 (1999)

The Granular Magnetic Fields of the Quiet Sun. *Haosheng Lin & Thomas Rimmele.* 514, 448 (1999)

Evolution of Eruptive Flares. II. The Occurrence of Locally Enhanced Resistivity. *Tetsuya Magara & Kazunari Shibata.* 514, 456 (1999)

Heating and Jet Formation by Hydrodynamic Cumulation in the Solar Atmosphere. *T. Tarbell, M. Ryutova, J. Covington, & A. Fludra.* 514, L47 (1999)

The Search for Solar Gravity-Mode Oscillations: An Analysis Using *Ulysses* Magnetic Field Data. *David G. T. Denison & Andrew T. Walden.* 514, 972 (1999)

Acoustic Imaging in Helioseismology. *Dean-Yi Chou, Hsiang-Kuang Chang, Ming-Tsung Sun, Barry LaBonte, Huei-Ru Chen, Sheng-Jen Yeh, Heng-Tai Tang, Wei-Cheng Shiu, Yi-Liang Chen, Antonio Jimenez, Maria Cristina Rabello-Soares, Guoxiang Ai, Gwo-Ping Wang, Philip Goode, William Marquette, Shuhrat Ehgamberdiev, & Shukur Khalikov.* 514, 979 (1999)

Photospheric Magnetic Reconnection and Canceling Magnetic Features on the Sun. *Yuri E. Litvinenko.* 515, 435 (1999)

On the Origin of Magnetic Fields in the Quiet Photosphere. *Fausto Cattaneo.* 515, L39 (1999)

Fractal Analysis of Michelson Doppler Imager Magnetograms: A Contribution to the Study of Solar Active Regions. *N. Meunier.* 515, 801 (1999)

Magnetic and Radiative Variability of Solar Surface Structures. I. Image Decomposition and Magnetic-Intensity Mapping. *Karen L. Harvey & Oran R. White.* 515, 812 (1999)

SUN: OSCILLATIONS

Helioseismic Images of an Active Region Complex. *D. C. Braun & C. Lindsey.* 513, L79 (1999)

Seismic Images of a Solar Flare. *A.-C. Donea, D. C. Braun, & C. Lindsey.* 513, L143 (1999)

Source of Solar Acoustic Modes. *R. Nigam & A. G. Kosovichev.* 514, L53 (1999)

The Search for Solar Gravity-Mode Oscillations: An Analysis Using *Ulysses* Magnetic Field Data. *David G. T. Denison & Andrew T. Walden.* 514, 972 (1999)

Acoustic Imaging in Helioseismology. *Dean-Yi Chou, Hsiang-Kuang Chang, Ming-Tsung Sun, Barry LaBonte, Huei-Ru Chen, Sheng-Jen Yeh, Heng-Tai Tang, Wei-Cheng Shiu, Yi-Liang Chen, Antonio Jimenez, Maria Cristina Rabello-Soares, Guoxiang Ai, Gwo-Ping Wang, Philip Goode, William Marquette, Shuhrat Ehgamberdiev, & Shukur Khalikov.* 514, 979 (1999)

Absorption/Emission of Solar *p*-Modes: Michelson Doppler Interferometer/*SOHO* Observations. *Deborah Haber, Rekha Jain, & Ellen G. Zweibel.* 515, 832 (1999)

SUN: PARTICLE EMISSION

On the Solar-Cycle Modulation of the Homestake Solar Neutrino Capture Rate and the Shuffle Test. *Guenther Walther.* 513, 990 (1999)

The Search for Solar Gravity-Mode Oscillations: An Analysis Using *Ulysses* Magnetic Field Data. *David G. T. Denison & Andrew T. Walden.* 514, 972 (1999)

SUN: PHOTOSPHERE

Photospheric Magnetic Reconnection and Canceling Magnetic Features on the Sun. *Yuri E. Litvinenko.* 515, 435 (1999)

Time Series of Solar Granulation Images. II. Evolution of Individual Granules. *J. Hirzberger, J. A. Bonet, M. Vázquez, & A. Hanslmeier.* 515, 441 (1999)

On the Origin of Magnetic Fields in the Quiet Photosphere. *Fausto Cattaneo.* 515, L39 (1999)

Fractal Analysis of Michelson Doppler Imager Magnetograms: A Contribution to the Study of Solar Active Regions. *N. Meunier.* 515, 801 (1999)

SUN: PROMINENCES

A Stable Filament Cavity with a Hot Core. *H. S. Hudson, L. W. Acton, K. L. Harvey, & D. E. McKenzie.* 513, L83 (1999)

SUN: RADIO RADIATION

A Study of Microwave-selected Coronal Transient Brightenings. *A. Nindos, M. R. Kundu, & S. M. White.* 513, 983 (1999)

SUN: SOLAR-TERRESTRIAL RELATIONS

Transport and Acceleration of Energetic Charged Particles near an Oblique Shock. *D. Ruffolo.* 515, 787 (1999)

SUN: SOLAR WIND

Heating and Acceleration of the Solar Wind via Gravity Damping of Alfvén Waves. *Iolanda Cuseri, Dermott Mullan, Giancarlo Noci, & Giannina Poletto.* 514, 989 (1999)

The Interaction of a Strong Magnetic Field with a Cold Plasma: The Evolution of a Magnetic Bubble. *William I. Newman & Alice L. Newman.* 515, 685 (1999)

SUN: SUNSPOTS

Helioseismic Images of an Active Region Complex. *D. C. Braun & C. Lindsey.* 513, L79 (1999)

On the Solar-Cycle Modulation of the Homestake Solar Neutrino Capture Rate and the Shuffle Test. *Guenther Walther.* 513, 990 (1999)

Seismic Images of a Solar Flare. *A.-C. Donea, D. C. Braun, & C. Lindsey.* 513, L143 (1999)

Acoustic Imaging in Helioseismology. *Dean-Yi Chou, Hsiang-Kuang Chang, Ming-Tsung Sun, Barry LaBonte, Huei-Ru Chen, Sheng-Jen Yeh, Heng-Tai Tang, Wei-Cheng Shiu, Yi-Liang Chen, Antonio Jimenez, Maria Cristina Rabello-Soares, Guoxiang Ai, Gwo-Ping Wang, Philip Goode, William Marquette, Shuhrat Ehgamberdiev, & Shukur Khalikov.* 514, 979 (1999)

SUN: TRANSITION REGION

Heating and Jet Formation by Hydrodynamic Cumulation in the Solar Atmosphere. *T. Tarbell, M. Ryutova, J. Covington, & A. Fludra.* 514, L47 (1999)

SUN: UV RADIATION

Extreme-Ultraviolet Jets and Hα Surges in Solar Microflares. *Jongchul Chae, Jiong Qiu, Haimin Wang, & Philip R. Goode.* 513, L75 (1999)

Using Temporal Variations of the Nonthermal Redshifted Ly*alpha* Emission to Deduce Properties of Proton Beams Injected into a Stellar Atmosphere. *Jeffrey W. Brosius & Bruce E. Woodgate.* 514, 430 (1999)

Three-dimensional Stereoscopic Analysis of Solar Active Region Loops. I. *SOHO*/EIT Observations at Temperatures of (1.0–1.5) $\times 10^6$ K. *Markus J. Aschwanden, Jeffrey S. Newmark, Jean-Pierre Delaboudinière, Werner M. Neupert, J. A. Klimchuk, G. Allen Gary, Fabrice Portier-Fozzani, & Arik Zucker.* 515, 842 (1999)

SUN: X-RAYS, GAMMA RAYS

A Stable Filament Cavity with a Hot Core. *H. S. Hudson, L. W. Acton, K. L. Harvey, & D. E. McKenzie.* 513, L83 (1999)

A Study of Microwave-selected Coronal Transient Brightenings. *A. Nindos, M. R. Kundu, & S. M. White.* 513, 983 (1999)

The Solar Flare Soft X-Ray Differential Emission Measure and the Neupert Effect at Different Temperatures. *James M. McTiernan, George H. Fisher, & Peng Li.* 514, 472 (1999)

Hard and Soft X-Ray Observations of Occulted and Nonocculted Solar Limb Flares. *John T. Mariska & James M. McTiernan.* 514, 484 (1999)

SURVEYS

The REX Survey: A Search for Radio-emitting X-Ray Sources. *Alessandro Caccianiga, Tommaso Maccacaro, Anna Wolter, Roberto Della Ceca, & Isabella M. Gioia.* 513, 51 (1999)

A New Assessment of the Completeness of Quasar Surveys: Implications for the Luminosity Function. *Matthew J. Graham, Roger G. Clowes, & Luis E. Campusano.* 513, 69 (1999)

The Globular Cluster System in the Inner Region of M87. *Arunav Kundu, Bradley C. Whitmore, William B. Sparks, F. Duccio Macchetto, Stephen E. Zepf, & Keith M. Ashman.* 513, 733 (1999)

Radio Pulses along the Galactic Plane. *David J. Nice.* 513, 927 (1999)

A Flux-limited Sample of Bright Clusters of Galaxies from the Southern Part of the *ROSAT* All-Sky Survey: The Catalog and log *N*–log*S*. *S. De Grandi, H. Böhringer, L. Guzzo, S. Molendi, G. Chincarini, C. Collins, R. Cruddace, D. Neumann, S. Schindler, P. Schuecker, & W. Voges.* 514, 148 (1999)

Biasing and High-Order Statistics from the Southern-Sky Redshift Survey. *C. Benoist, A. Cappi, L. N. da Costa, S. Maurogordato, F. R. Bouchet, & R. Schaeffer.* 514, 563 (1999)

Compact Nuclei in Galaxies at Moderate Redshift. II. Their Nature and Implications for the Active Galactic Nucleus Luminosity Function. *Vicki L. Sarajedini, Richard F. Green, Richard E. Griffiths, & Kavan Ratnatunga.* 514, 746 (1999)

The Canada-UK Deep Submillimeter Survey: First Submillimeter Images, the Source Counts, and Resolution of the Background. *Stephen Eales, Simon Lilly, Walter Gear, Loretta Dunne, J. Richard Bond, Francois Hammer, Olivier Le Fèvre, & David Crampton.* 515, 518 (1999)

A Survey of Planetary Nebulae in the Southern Galactic Bulge. *Sylvie F. Beaulieu, Michael A. Dopita, & Kenneth C. Freeman.* 515, 610 (1999)

TECHNIQUES: IMAGE PROCESSING

Restoration and Photometry of Full-Disk Solar Images. *Stephen R. Walton & Dora G. Preminger.* 514, 959 (1999)

Three-dimensional Stereoscopic Analysis of Solar Active Region Loops. I. *SOHO*/EIT Observations at Temperatures of (1.0–1.5) $\times 10^6$ K. *Markus J. Aschwanden, Jeffrey S. Newmark, Jean-Pierre Delaboudinière, Werner M. Neupert, J. A. Klimchuk, G. Allen Gary, Fabrice Portier-Fozzani, & Arik Zucker.* 515, 842 (1999)

TECHNIQUES: INTERFEROMETRIC

Sub–Astronomical Unit Structure of the Near-Infrared Emission from AB Aurigae. *R. Millan-Gabet, F. P. Schloerb, W. A. Traub, F. Malbet, J. P. Berger, & J. D. Bregman.* 513, L131 (1999)

Interferometric Observation of Cosmic Microwave Background Anisotropies. *Martin White, John E. Carlstrom, Mark Dragovan, & William L. Holzapfel.* 514, 12 (1999)

Hot Gas and Dust in a Protostellar Cluster near W3(OH). *Friedrich Wyrowski, Peter Schilke, C. Malcolm Walmsley, & Karl M. Menten.* 514, L43 (1999)

The Visual Orbit of ι Pegasi. *A. F. Boden, C. D. Koresko, G. T. van Belle, M. M. Colavita, P. J. Dumont, J. Gubler, S. R. Kulkarni, B. F. Lane, D. Mobley, M. Shao, J. K. Wallace, (The PTI Collaboration), & G. W. Henry.* 515, 356 (1999)

TECHNIQUES: SPECTROSCOPIC

On Measuring Nebular Chemical Abundances in Distant Galaxies Using Global Emission-Line Spectra. *Henry A. Kobulnicky, Robert C. Kennicutt, Jr., & James L. Pizagno.* 514, 544 (1999)

TURBULENCE

Characteristic Scales of Photospheric Flows and Their Magnetic and Temperature Markers. *J. K. Lawrence, A. C. Cadavid, & A. A. Ruzmaikin.* 513, 506 (1999)

Nonlinear α-Effect in Dynamo Theory. *George B. Field, Eric G. Blackman, & Hongsong Chou.* 513, 638 (1999)

Long-Term Scintillation Studies of Pulsars. II. Refractive Effects and the Spectrum of Plasma Density Fluctuations. *N. D. Ramesh Bhat, Yashwant Gupta, & A. Pramesh Rao.* 514, 249 (1999)

Long-Term Scintillation Studies of Pulsars. III. Testing Theoretical Models of Refractive Scintillation. *N. D. Ramesh Bhat, A. Pramesh Rao, & Yashwant Gupta.* 514, 272 (1999)

Source of Solar Acoustic Modes. *R. Nigam & A. G. Kosovichev.* 514, L53 (1999)

Wind Inhomogeneities in Wolf-Rayet Stars. II. Investigation of Emission-Line Profile Variations. *Sébastien Lépine & Anthony F. J. Moffat.* 514, 909 (1999)

A Supernova-regulated Interstellar Medium: Simulations of the Turbulent Multiphase Medium. *M. J. Korpi, A. Brandenburg, A. Shukurov, I. Tuominen, & Å Nordlund.* 514, L99 (1999)

Clouds as Turbulent Density Fluctuations: Implications for Pressure Confinement and Spectral Line Data Interpretation. *Javier Ballesteros-Paredes, Enrique Vázquez-Semadeni, & John Scalo.* 515, 286 (1999)

The Collisions of High-Velocity Clouds with a Magnetized Gaseous Galactic Disk. *Alfredo Santillán, José Franco, Marco Martos, & Jongsoo Kim.* 515, 657 (1999)

ULTRAVIOLET: GALAXIES

The Ultraviolet Upturn in Elliptical Galaxies as an Age Indicator. *Sukyoung Yi, Young-Wook Lee, Jong-Hak Woo, Jang-Hyun Park, Pierre Demarque, & Augustus Oemler, Jr.* 513, 128 (1999)

Multiwavelength Study of the Starburst Galaxy NGC 7714. I. Ultraviolet-Optical Spectroscopy. *Rosa M. González Delgado, María Luisa García-Vargas, Jeff Goldader, Claus Leitherer, & Anna Pasquali.* 513, 707 (1999)

Hubble Space Telescope Images and Spectra of the Remnant of SN 1885 in M31. *Robert A. Fesen, Christopher L. Gerardy, Kevin M. McLin, & Andrew J. S. Hamilton.* 514, 195 (1999)

Ultraviolet Imaging Polarimetry of Narrow-Line Radio Galaxies. *Todd Hurt, Robert Antonucci, Ross Cohen, Anne Kinney, & Julian Krolik.* 514, 579 (1999)

A Reanalysis of the Ultraviolet Extinction from Interstellar Dust in the Large Magellanic Cloud. *K. A. Misselt, Geoffrey C. Clayton, & Karl D. Gordon.* 515, 128 (1999)

The PG X-Ray QSO Sample: Links between the Ultraviolet–X-Ray Continuum and Emission Lines. *Beverley J. Wills, A. Laor, M. S.*

Brotherton, D. Wills, B. J. Wilkes, G. J. Ferland, & Zhaohui Shang. 515, L53 (1999)

ULTRAVIOLET: GENERAL

A Detailed Analysis of the Stellar and Nebular *IUE* Spectrum of the Peculiar "O VI Sequence" Planetary Nebula NGC 40. *Walter A. Feibelman.* 514, 296 (1999)

ULTRAVIOLET: ISM

Hubble Space Telescope Images and Spectra of the Remnant of SN 1885 in M31. *Robert A. Fesen, Christopher L. Gerardy, Kevin M. McLin, & Andrew J. S. Hamilton.* 514, 195 (1999)

Spectroscopic Observations of the Planetary Nebula NGC 6818. *Siek Hyung, Lawrence H. Aller, & Walter A. Feibelman.* 514, 878 (1999)

ULTRAVIOLET: STARS

Changes and Absorption Features in the Ultraviolet Spectrum of the PG 1159–Type Central Star RX J2117+3412. *Walter A. Feibelman.* 513, 947 (1999)

Using Temporal Variations of the Nonthermal Redshifted Ly*alpha* Emission to Deduce Properties of Proton Beams Injected into a Stellar Atmosphere. *Jeffrey W. Brosius & Bruce E. Woodgate.* 514, 430 (1999)

First Observations of an R Coronae Borealis Star with the Space Telescope Imaging Spectrograph: RY Sagittarii near Maximum Light. *Geoffrey C. Clayton, T. R. Ayres, Warrick A. Lawson, John S. Drilling, P. Woitke, & Martin Asplund.* 515, 351 (1999)

The Active Corona of HD 35850 (F8 V). *Marc Gagné, Jeff A. Valenti, Jeffrey L. Linsky, Gianpiero Tagliaferri, Stefano Covino, & Manuel Güdel.* 515, 423 (1999)

Extreme Ultraviolet Explorer Photometry of RS Canum Venaticorum Systems: Four Flaring Megaseconds. *Rachel A. Osten & Alexander Brown.* 515, 746 (1999)

WAVES

Rossby Wave Instability of Keplerian Accretion Disks. *R. V. E. Lovelace, H. Li, S. A. Colgate, & A. F. Nelson.* 513, 805 (1999)

Slow Magnetosonic Waves in Coronal Plumes. *L. Ofman, V. M. Nakariakov, & C. E. DeForest.* 514, 441 (1999)

Alfvén Wave Model of Spicules and Coronal Heating. *Takahiro Kudoh & Kazunari Shibata.* 514, 493 (1999)

A Wavelet Exploration of the Q0957+561A,B Brightness Record. *R. Schild.* 514, 598 (1999)

Heating and Acceleration of the Solar Wind via Gravity Damping of Alfvén Waves. *Iolanda Cuseri, Dermott Mullan, Giancarlo Noci, & Giannina Poletto.* 514, 989 (1999)

Weak Lensing by Large-Scale Structure and the Polarization Properties of Distant Radio Sources. *Gabriela C. Surpi & Diego D. Harari.* 515, 455 (1999)

The Collisions of High-Velocity Clouds with a Magnetized Gaseous Galactic Disk. *Alfredo Santillán, José Franco, Marco Martos, & Jongsoo Kim.* 515, 657 (1999)

The Effect of an Isothermal Atmosphere on the Propagation of Three-dimensional Waves in a Thermally Stratified Accretion Disk. *G. I. Ogilvie & S. H. Lubow.* 515, 767 (1999)

Stochastic Acceleration of Electrons by Plasma Waves. III. Waves Propagating Perpendicular to the Magnetic Field. *Julia M. Pryadko & Vahé Petrosian.* 515, 873 (1999)

X-RAYS: BURSTS

Bursts from GS 1826−238: A Clocked Thermonuclear Flashes Generator. *P. Ubertini, A. Bazzano, M. Cocchi, L. Natalucci, J. Heise, J. M. Muller, & J. J. M. in 't Zand.* 514, L27 (1999)

Evidence for Antipodal Hot Spots during X-Ray Bursts from 4U 1636−536. *M. Coleman Miller.* 515, L77 (1999)

X-RAYS: GALAXIES

The Enhancement and Decrement of the Sunyaev-Zeldovich Effect toward the *ROSAT* Cluster RX J0658−5557. *P. Andreani, H. Böhringer, G. Dall'Oglio, L. Martinis, P. Shaver, R. Lemke, L.-Å. Nyman, R. Booth, L. Pizzo, N. Whyborn, Y. Tanaka, & H. Liang.* 513, 23 (1999)

Properties of Galactic Outflows: Measurements of the Feedback from Star Formation. *Crystal L. Martin.* 513, 156 (1999)

Hard X-Ray Radiation in the Coma Cluster Spectrum. *Roberto Fusco-Femiano, Daniele Dal Fiume, Luigina Feretti, Gabriele Giovannini, Paola Grandi, Giorgio Matt, Silvano Molendi, & Andrea Santangelo.* 513, L21 (1999)

Reconstructing the Radial Profiles of Gas Density and Temperature in Clusters of Galaxies from High-Resolution X-Ray and Radio Observations. *Kohji Yoshikawa & Yasushi Suto.* 513, 549 (1999)

A Gamma-Ray Flare from PKS 2255−282. *D. J. Macomb, N. Gehrels, & C. R. Shrader.* 513, 652 (1999)

A Hot Spot in Coma. *R. Hank Donnelly, M. Markevitch, W. Forman, C. Jones, E. Churazov, & M. Gilfanov.* 513, 690 (1999)

The Isolated Elliptical Galaxy NGC 1132: Evidence for a Merged Group of Galaxies? *John S. Mulchaey & Ann I. Zabludoff.* 514, 133 (1999)

High-Energy Emission from the TeV Blazar Markarian 501 during Multiwavelength Observations in 1996. *J. Kataoka, J. R. Mattox, J. Quinn, H. Kubo, F. Makino, T. Takahashi, S. Inoue, R. C. Hartman, G. M. Madejski, P. Sreekumar, & S. J. Wagner.* 514, 138 (1999)

A Flux-limited Sample of Bright Clusters of Galaxies from the Southern Part of the *ROSAT* All-Sky Survey: The Catalog and log *N*–log*S*. *S. De Grandi, H. Böhringer, L. Guzzo, S. Molendi, G. Chincarini, C. Collins, R. Cruddace, D. Neumann, S. Schindler, P. Schuecker, & W. Voges.* 514, 148 (1999)

X-Ray Iron Line Reverberation from Black Hole Accretion Disks. *Christopher S. Reynolds, Andrew J. Young, Mitchell C. Begelman, & Andrew C. Fabian.* 514, 164 (1999)

A Cutoff in the X-Ray Fluctuation Power Density Spectrum of the Seyfert 1 Galaxy NGC 3516. *Rick Edelson & Kirpal Nandra.* 514, 682 (1999)

Hot Gas Halo of NGC 3923: Circulation of Intergalactic Matter. *Shinji Sato & Yuzuru Tawara.* 514, 765 (1999)

ASCA Observations of the Starburst-driven Superwind Galaxy NGC 2146: Broadband (0.6–9 keV) Spectral Properties. *Roberto Della Ceca, Richard E. Griffiths, Timothy M. Heckman, Matthew D. Lehnert, & Kimberly A. Weaver.* 514, 772 (1999)

Rossi X-Ray Timing Explorer Hard X-Ray Observation of Abell 754: Constraining the Hottest Temperature Component and the Intracluster Magnetic Field. *Azita Valinia, Mark J. Henriksen, Michael Lowenstein, Kurt Roettiger, Richard F. Mushotzky, & Greg Madejski.* 515, 42 (1999)

ASCA and Contemporaneous Ground-based Observations of the BL Lacertae Objects 1749+096 and 2200+420 (BL Lac). *Rita M. Sambruna, Gabriele Ghisellini, Eric Hooper, R. I. Kollgaard, Joseph E. Pesce, & C. Megan Urry.* 515, 140 (1999)

A Comparison of Metal Enrichment Histories in Rich Clusters and Individual Luminous Elliptical Galaxies. *Fabrizio Brighenti & William G. Mathews.* 515, 542 (1999)

Broadband X-Ray Observations of the Narrow-Line X-Ray Galaxy NGC 5506. *T. Wang, T. Mihara, C. Otani, M. Matsuoka, & H. Awaki.* 515, 567 (1999)

On Radio and X-Ray Emission Mechanisms in Nearby, X-Ray–bright Galactic Nuclei. *Insu Yi & Stephen P. Boughn.* 515, 576 (1999)

The PG X-Ray QSO Sample: Links between the Ultraviolet–X-Ray Continuum and Emission Lines. *Beverley J. Wills, A. Laor, M. S. Brotherton, D. Wills, B. J. Wilkes, G. J. Ferland, & Zhaohui Shang.* 515, L53 (1999)

X-RAYS: GENERAL

The X-Ray Luminosity Function of Bright Galaxy Clusters in the Local Universe. *S. De Grandi, L. Guzzo, H. Böhringer, S. Molendi, G. Chincarini, C. Collins, R. Cruddace, D. Neumann, S. Schindler, P. Schuecker, & W. Voges.* 513, L17 (1999)

The X-Ray Afterglow of the Gamma-Ray Burst of 1997 May 8: Spectral Variability and Possible Evidence of an Iron Line. *L. Piro, E. Costa, M. Feroci, F. Frontera, L. Amati, D. Dal Fiume, L. A. Antonelli, J. Heise, J. in 't Zand, A. Owens, A. N. Parmar, G. Cusumano, M. Vietri, & G. C. Perola.* 514, L73 (1999)

On Radio and X-Ray Emission Mechanisms in Nearby, X-Ray–bright Galactic Nuclei. *Insu Yi & Stephen P. Boughn.* 515, 576 (1999)

X-RAYS: ISM

Supernova Remnants in the Magellanic Clouds. II. Supernova Remnant Breakouts from N11L and N86. *Rosa Murphy Williams, You-Hua Chu, John R. Dickel, R. Chris Smith, Douglas K. Milne, & P. Frank Winkler.* 514, 798 (1999)

X-RAYS: STARS

Rossi X-Ray Timing Explorer Observations of the Anomalous Pulsar 4U 0142+61. *Colleen A. Wilson, Stefan Dieters, Mark H. Finger, D. Matthew Scott, & Jan van Paradijs.* 513, 464 (1999)

Hard X-Ray Variability of the Black Hole Candidate GRO J0422+32 during Its 1992 Outburst. *F. van der Hooft, C. Kouveliotou, J. van Paradijs, W. S.*

Paciesas, W. H. G. Lewin, M. van der Klis, D. J. Crary, M. H. Finger, B. A. Harmon, & S. N. Zhang. 513, 477 (1999)

Could 2S 0114+650 Be a Magnetar? *X.-D. Li & E. P. J. van den Heuvel.* 513, L45 (1999)

Implications from Extreme-Ultraviolet Observations for Coronal Heating of Active Stars. *Marc Audard, Manuel Güdel, & Edward F. Guinan.* 513, L53 (1999)

A Population of Faint Nontransient Low-Mass Black Hole Binaries. *Kristen Menou, Ramesh Narayan, & Jean-Pierre Lasota.* 513, 811 (1999)

Relativistic Precession around Rotating Neutron Stars: Effects Due to Frame Dragging and Stellar Oblateness. *Sharon M. Morsink & Luigi Stella.* 513, 827 (1999)

Rossi X-Ray Timing Explorer Observation of PSR B1706−44 and Implications for Theoretical Models of Pulsar Emission. *A. Ray, A. K. Harding, & M. Strickman.* 513, 919 (1999)

Discovery of Twin Kilohertz Quasi-periodic Oscillations in the High Galactic Latitude X-Ray Transient XTE J2123−058. *Jeroen Homan, Mariano Mendez, Rudy Wijnands, Michiel van der Klis, & Jan van Paradijs.* 513, L119 (1999)

Magnetic Propeller Outflows. *R. V. E. Lovelace, M. M. Romanova, & G. S. Bisnovatyi-Kogan.* 514, 368 (1999)

X-Ray Shots of Cygnus X-1. *Y. X. Feng, T. P. Li, & L. Chen.* 514, 373 (1999)

Radio and X-Ray Observations of the 1998 Outburst of the Recurrent X-Ray Transient 4U 1630−47. *R. M. Hjellming, M. P. Rupen, A. J. Mioduszewski, E. Kuulkers, M. McCollough, B. A. Harmon, M. Buxton, R. Sood, A. Tzioumis, D. Rayner, S. Dieters, & P. Durouchoux.* 514, 383 (1999)

Discovery of Microsecond Soft Lags in the X-Ray Emission of the Atoll Source 4U 1636−536. *Philip Kaaret, Santina Piraino, Eric C. Ford, & Andrea Santangelo.* 514, L31 (1999)

The Broadband Power Spectra of X-Ray Binaries. *Rudy Wijnands & Michiel van der Klis.* 514, 939 (1999)

X-Ray Variability from the Compact Source in the Supernova Remnant RCW 103. *E. V. Gotthelf, R. Petre, & G. Vasisht.* 514, L107 (1999)

Multicomponent X-Ray Emissions from Regions near or on the Pulsar Surface. *K. S. Cheng & L. Zhang.* 515, 337 (1999)

X-Ray Novae, Event Horizons, and the Exponential Metric. *Stanley L. Robertson.* 515, 365 (1999)

V2301 Ophiuchi: An X-Ray–bright Eclipsing AM Herculis Object. *Thomas Y. Steiman-Cameron & James N. Imamura.* 515, 404 (1999)

The Active Corona of HD 35850 (F8 V). *Marc Gagné, Jeff A. Valenti, Jeffrey L. Linsky, Gianpiero Tagliaferri, Stefano Covino, & Manuel Güdel.* 515, 423 (1999)

A Giant Outburst from SGR 1900+14 Observed with the *BeppoSAX* Gamma-Ray Burst Monitor. *M. Feroci, F. Frontera, E. Costa, L. Amati, M. Tavani, M. Rapisarda, & M. Orlandini.* 515, L9 (1999)

Rossi X-Ray Timing Explorer Observation of Cygnus X-1. III. Implications for Compton Corona and Advection-dominated Accretion Flow Models. *Michael A. Nowak, Jörn Wilms, Brian A. Vaughan, James B. Dove, & Mitchell C. Begelman.* 515, 726 (1999)

Extreme Ultraviolet Explorer Photometry of RS Canum Venaticorum Systems: Four Flaring Megaseconds. *Rachel A. Osten & Alexander Brown.* 515, 746 (1999)

Thermal X-Ray Line Emission from Accreting Black Holes. *Ramesh Narayan & John Raymond.* 515, L69 (1999)